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RESEARCH ARTICLE

Six Dimensions of Concentration in Economics: Evidence from a Large-Scale Data Set

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Argument
This paper argues that the economics discipline is highly concentrated, which may inhibit scientific innovation and change in the future. The argument is based on an empirical investigation of six dimensions of concentration in economics between 1956 and 2016 using a large-scale data set. The results show that North America accounts for nearly half of all articles and three quarters of all citations. Twenty institutions reap a share of 42 percent of citations, five journals a share of 28.5 percent, and 100 authors a share of 15.5 percent. A total of 2.8 percent of citations may be attributed to heterodox schools of thought. Also top articles are concentrated along these dimensions. Overall, concentration has strongly increased over the last six decades.

Keywords: economics; scientometrics; concentration; citations; bibliometrics; inequality

The constitution of economics as a discipline, both in terms of content and institutional structure, has been much debated over the last few decades. Many authors have argued that economics is more concentrated in terms of volume and recognition of research than most other disciplines (see e.g. Varga 2011 and Fourcade et al. 2015). Investigating concentration is crucial as the development of elites within economics, be it on the level of articles, journals, regions, institutions, authors, or paradigms, may be unhealthy for creativity and innovation. This concern was prominently voiced by Akerlof, Deaton, Fudenberg, Hansen, and Heckman at the 2017 ASSA Annual Meeting (AEA 2017). Concentration, which is also reflected in academic rankings, may contribute to an incentive structure that discourages economists from publishing on critical issues such as climate change that lie outside the core of the economics profession (Hudson 2013). It may thus lead to an intellectual "lock-in" that inhibits change and acts as a barrier against new ideas and approaches (Hodgson and Rothman 1999).

One way of capturing concentration in science is scientometrics, i.e. the statistical analysis of bibliographic data about scientific research. The most common function of scientometrics today is the calculation of citation metrics such as impact factors for journals, departments, or authors. However, scientometrics also has a "cognitive" function (Rip and Courtial 1984), as it allows revealing latent structures in scientific discourses.

In this paper, we apply scientometric methods to a large-scale data set of around 3.5 million citations, which include around 421 thousand articles published between 1956 and 2016 in 433 economics journals listed in Thomson Reuters' Web of Science. We investigate six dimensions along which concentration occurs: individual articles, journals, regions, institutions, authors, and paradigms. To our knowledge, this big-data analysis is the first to capture six dimensions of concentration in economics. The long time period covered by the data set also makes it possible to provide an overview of the dynamics of concentration in the discipline over the last sixty years.

1. Concentration in economics

Several studies have addressed at least one dimension of concentration in economics. For instance, on the level of authors, Tollison and Goff (1986) find that, within their discipline, influential economists are cited substantially more often than influential physicists are cited within physics. Tol (2009, 2013) further finds a pronounced "Matthew effect," i.e. the positive effect that prestige has on academic recognition of research (Merton 1968), on the level of authors. The results of Birkmaier and Wohlrabe (2014) are more nuanced with an effect present for fewer authors. The results also indicate that the Matthew effect may be a temporary phenomenon present only until a certain threshold of citations is reached.

On the level of articles, Laband and Tollison (2003) report that a quarter of all articles in 1974 and 1996 were "dry holes" that received 0 citations. Laband (2013) adds to this picture and shows that for a sample of 248 economics journals published between 2001–2005, the top five percent of articles received 55 percent of all citations. In contrast, the lower 55 percent of articles only accounted for 10 percent of all citations, indicating an uneven distribution of citations on the article level.

Similarly, he finds that the top 10 percent of journals account for half of all citations and 87 percent of the highest impact articles. Concentration of high-impact research in a few top journals has also been addressed by Card and DellaVigna (2013) with respect to the special status of the "Top Five" journals in economics: the *American Economic Review* (AER), the *Quarterly Journal of Economics* (QJE), the *Journal of Political Economy* (JPE), *Econometrica* (Ectra), and the *Review of Economic Studies* (REStud). In a panel address, Heckman (2017) showed RePEc data to illustrate the dominant role of these journals and argued that the disciplines' excessive deference to them may inhibit innovation.

In addition, there is a substantial geographical concentration in economics, with the United States holding an especially dominant position in the discipline (Coupé 2003; Elliott et al. 1998; Sutter and Kocher 2001). For instance, Hodgson and Rothman (1999) report that 66 percent of authors and 71 percent of journal editors were located in U.S. institutions. Kalaitzidakis et al. (1999) find that North American (USA and Canada) authors made up between 69 and 90 percent of all authors in ten core journals between 1970 and 1994.

Even within the United States, only a few high profile economics departments play a decisive role. According to Fourcade et al. (2015), institutional concentration within the economics discipline's most-cited journals is more pronounced than in other disciplines. This suggests that economics is oriented more inward and towards the top of its internal hierarchy. Congruently, Wu (2007) finds that five economics departments accounted for 47, 29, and 22 percent of published pages in the *QJE*, *JPE*, and *AER* between 2000 and 2003, respectively. Similarly, Kocher and Sutter (2001) show that authors affiliated with ten U.S. universities accounted for a quarter of articles published in 15 top-journals between 1977 to 1997. This effect was found to be even stronger when considering PhD affiliations rather than current affiliations. Also previous studies reported that graduates from selected top graduate programs accounted for the majority of published pages (Hogan 1986; Hirsch et al. 1984) and the highest performing authors (Cox and Chung 1991) in the most prestigious economics journals.

Hodgson and Rothman (1999) revealed that this "institutional oligopoly" also extends to the level of journal editors for the year 1995. Twelve institutions accounted for 39 percent of journal editors in the top 30 journals. The finding that personal ties between author and editor increase the chance of publication (Laband and Piette 1994; Medoff 2003) offers one explanation for the strong institutional concentration among authors. Furthermore, Medoff (2006) finds evidence for an institutional Matthew effect in economics, in particular for authors affiliated with Harvard University and the University of Chicago. Controlling for author and journal quality as well as article-specific characteristics, articles by economists from these elite universities were cited disproportionately more often and sooner after publication.

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Several studies also investigate the evolution of the disciplines' research topics, methods, and paradigms. For instance, Angrist et al. (2017) show that there has been an empirical shift in economic research within all sub-fields of economics since 1980. With respect to the paradigmatic orientation of economics it has been suggested that the discipline has become increasingly narrow (Lee 2004; Colander et al. 2004) and follows a "mainstream core-heterodox periphery" structure (Davis 2008; Dobusch and Kapeller 2012; Colander et al. 2010). Glötzl and Aigner (2018) find evidence for such a pattern on the department level. Moreover, Bornmann and Wohlrabe (2017, 28) argue that papers published in the JEL field "History of Economic Thought, Methodology, and Heterodox Approaches" are systematically disadvantaged in research evaluations due the lower mean citation rates in the subfield. Concurrently to the breakdown of the Fordist postwar order in the 1970s, the importance of heterodox schools of thought declined (Stockhammer and Ramskogler 2012). Since the beginning crisis, a resurgence of heterodox and especially Keynesian economics has been evoked (Anon. 2009, 2013). However, Aigner et al. (2018) suggest that while the financial crisis caused a temporary increase of interest in classic contributions dealing with financial and economic instability, this was less pronounced in the "Top Five" journals and did not have much impact on the paradigmatic development of contemporary economics.

In the following sections, we scientometrically analyze a large-scale data set in order to investigate all of these six dimensions of concentration in economics and their dynamics over the last sixty years.

Data and methods

Our data set comprises 3,480,031 citations of 420,850 research items published between 1956 and 2016, retrieved from Thomson Reuters' Web of Science (WoS) published in 433 economics journals.[1] The selection of journals in our sample was based on the WoS subject category economics. To arrive at our final data set we first manually corrected the journal names in the data for different spellings, and second limited the selection of journals in order to further increase data quality.[2] Moreover, not all types of research items were taken into account for the analysis. In our data set we include all articles, reviews, and notes, as well as a subset of other research items that pass a threshold of ten citations.[3]

In the following, we refer to all research items in our data set as articles. Our analysis may be understood as capturing economics' internal structure, as we only include articles published in economics journals and restrict our analysis to citation relationships between them. Links to journals from other disciplines are not analyzed.

[1]To compile the data set and calculate the respective metrics we used R-Statistics (2018). The code is published by Aigner (2018) and is available under https://github.com/ernestaigner/economics.

[2]We discarded all journals with fewer than 11 articles, all journals with fewer than 100 references, all journals that were not listed for more than one year, all journal-years with more than 1,000 articles, and all journals with erratic gaps over time, i.e. journals where more than three-quarters of the years between the first and last data entry were gaps in the data. The parameters were chosen such that all journals which may skew the data are discarded while at the same time keeping the largest sample possible. This selection further reduced the number of journals in the sample to 433. In this step 62,840 of 654,708 research items with 13,530 references and 5,067 citations were discarded.

[3]The additional research items include editorial material, letters, book reviews, meeting abstracts, and discussions. Of the 159,888 items with 50,729 references and 34,088 citations in these categories, we kept 629 with 4,551 references and 15,524 citations. The reason for the inclusion of items in these categories beyond a certain threshold is that, while most items have nearly no citations, some outliers are highly cited and may rather be considered an article. One example is Modigliani and Miller (1963) which is cited 380 times (after the data set is reduced), but is listed as a book review. All other research items, which only constitute a very small fraction of the entries in the Web of Science (4759 items with 3,784 references and 2,507 citations), were not included (i.e. corrections, reprints, bibliographies, biographical items, news items, fiction and creative prose, chronologies, and abstracts of published items). A full overview can be found in table 7 in the appendix.

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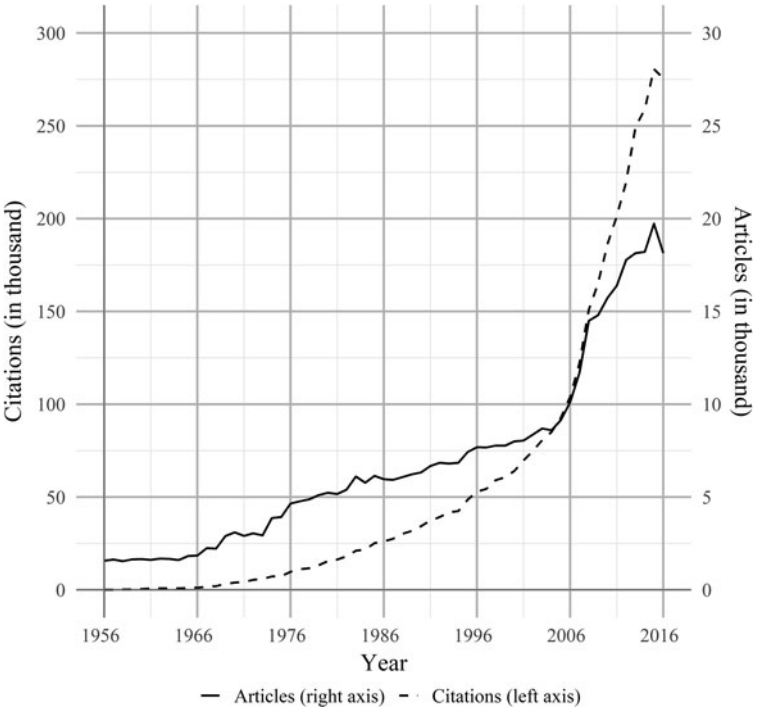

Fig. 1. Number of articles and citations each year, 1956–2016.

The size of the data set increases significantly with time as a result of the growing literature in economics as well as due to higher coverage in the WoS. Figure 1 shows the increases in the number of articles (solid line) and citations (dotted line); figure 2 shows the development of the number of journals.[4] The growth of citations each year has been exponential. The number of articles published each year increased fairly steadily until 2006. Between 2006 and 2007 both the number of articles and the number of journals in the data set soared. Thereafter, it continued to increase at a faster pace than before.

In addition to the data from the WoS, data on location and authors' affiliations, available for the time period 1980-2014, were retrieved from Thomson Reuters' InCites to investigate geographic and institutional concentration. To make the analysis of paradigmatic concentration possible, the data set was restricted to all journals that were still being published in 2016. These journals were then coded as "heterodox" or "mainstream" on the basis of the Heterodox Economics Directory (HED). The HED provides a list of all currently published journals that are considered to be open to publications from heterodox schools of thought (Kapeller and Springholz 2016). The 40 journals in the restricted sample that are on this list were coded as "heterodox," the remaining 344 journals were coded as "mainstream". The reduced data set encompasses 3,416,455 citations of 383,961 articles in 384 journals. Forty-nine journals that were no longer listed in Web of Science in 2016 (which can be the result of delistings, reclassifications, or the cessation of publication of the journal) were discarded from the analysis of paradigmatic concentration due to a lack of a satisfactory descriptor of their paradigmatic orientation. An overview on the three sub-samples of the data is given in Table 1.

[4]In some of the years there are more cited than published journals. This is possible as also articles in journals that are no longer published are cited.

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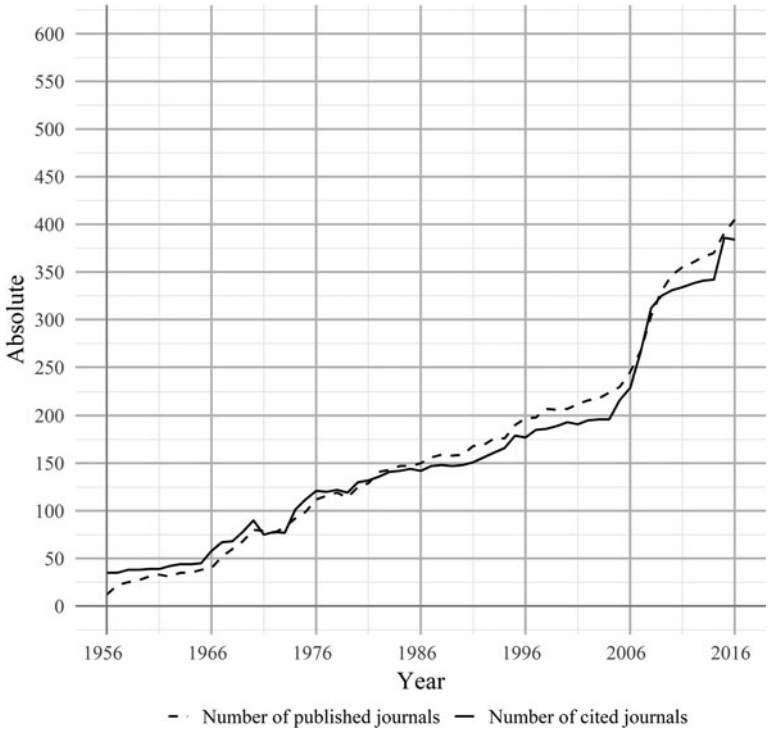

Fig. 2. Number of published and cited journals each year, 1956–2016.

Table 1. Overview on the three discussed subsamples.

	All journals[a]	2016 journals[b]	1980-2014[c]
Total articles	420,850	383,961	318,094
Cited articles	269,635	262,121	207,711
Total citations	3,480,031	3,416,455	2,462,698
Share of articles with zero citations	35.93	31.73	34.70
Mean citations per article	8.27	8.90	7.74
Median citations per article	1	2	2
Citations of the most highly cited article	4,386	4,301	3,963
Standard deviation of citations per article	37.02	38.14	31.79
Gini of citations per article	0.82	0.80	0.80
Gini of citations per cited article	0.71	0.71	0.70

Notes.
[a]The total sample of all articles and citations listed in the Web of Science subject category economics between 1956 and 2016. This sample is used for the analysis for article, journal, and author concentration.
[b]The restricted sample covering all articles and citations of journals that were still being published in 2016. This sample is used for the analysis of paradigmatic concentration.
[c]The sample covers the time period for which data on affiliation is available in the InCites database. This sample is used for the analysis of geographic and institutional concentration.

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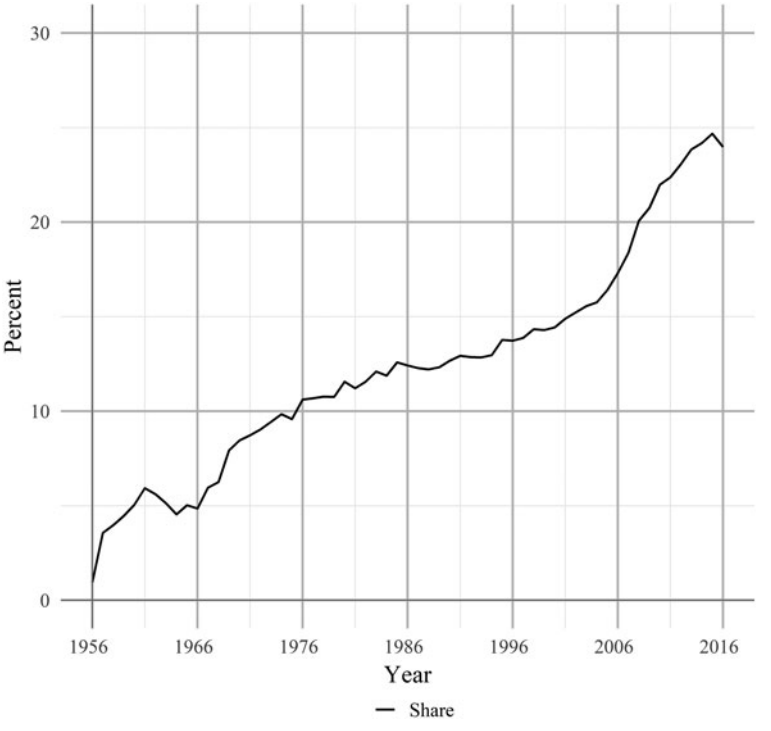

Fig. 3. Share of cumulative articles in the respective year cited at least once, 1956–2016.

To investigate concentration in economics, the data set was analyzed scientometrically. We chose three main indicators which provide information on different aspects of concentration for each year. The Gini coefficient is used as a general measure for the distribution of citations. In order to evaluate concentration with respect to specific groups of journals, institutions, countries or paradigms, the share of citations received by the respective group is considered. The share of a particular group in the top 100, 500, and 1000 most-cited articles or top 1, 5, 10 and 50 percent most-cited articles serves as an indicator for the concentration at the top. The results of this scientometric analysis are presented in what follows.

2. Results

2.1 Article concentration

Of the 420,850 articles in the data set, less than two-thirds were cited at least once in the respective year. The most cited article received 4,386 citations, while the average number of citations, per article is 8.27 with a standard deviation of 37.02. The median of 1 is significantly lower. This skewness is a first indicator of a concentration of citations. The overall Gini coefficient of 0.82 further underlines this. When only cited articles are considered, that is articles that were cited at least once, the Gini is still 0.71 (see Table 1).

Of the cumulative articles published up to the respective year (which is abbreviated as cumulative articles), the share that receive at least one citation in the respective year has continuously increased since 1956 and is around 23.4 percent in 2016 (see fig. 3). Still, the overall distribution of citations has become more concentrated. Fig. 4 shows the share of citations going to the top 1, 5, 10, and 50 percent of cited articles each year, i.e. of all articles that were cited at least once in the respective year.[5]

[5]Note that the measures of concentration would be significantly higher if the cumulative number of articles were taken into account.

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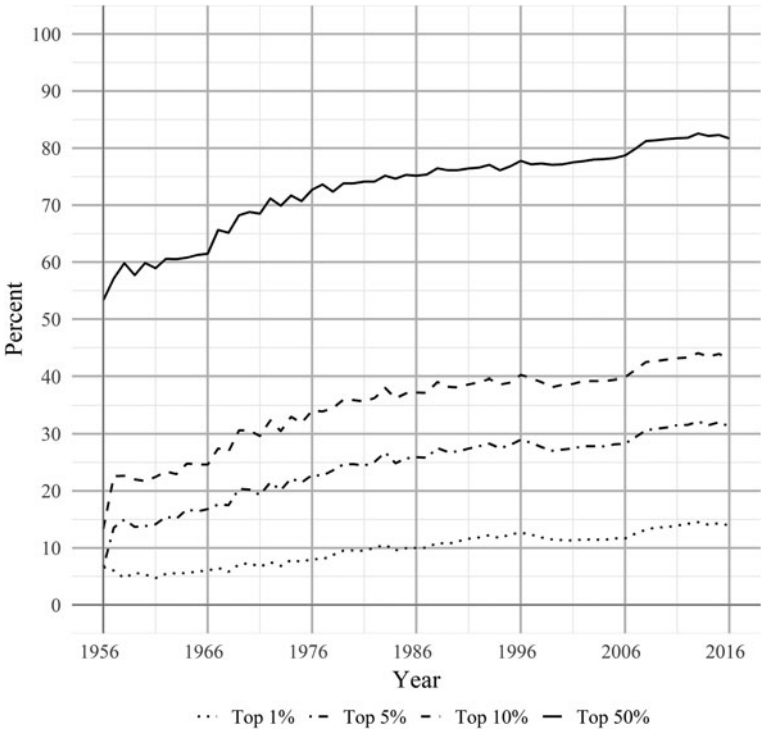

Fig. 4. Share of citations to the top 1, 5, 10, 50 percent of articles each year, 1956–2016.

The share of citations received by the top 1 percent of cited articles increased from around 5 percent in 1960 to around 15 percent in 2016. Even stronger was the increase for the top 5 percent, which accounted for around 14 percent in 1960, compared to more than 31 percent in 2016. The top 10 percent of cited articles doubled their share from 22 to 44 percent, the share of the top 50 percent increased from below 60 to around 82 percent.

The corresponding Gini coefficients of the citation distribution among the articles that were cited at least once in the respective year, depicted in fig. 5, further support the finding of increasing concentration on the article level. The coefficient rose over the entire observation period from below 0.2 in the late 1950s to 0.5 in 2016. The sharpest increase is observable between 1966 and 1972, after which the steepness of the slope gradually declined. The Gini coefficient stayed roughly constant at below 0.45 between 1996 and 2006. Concurrently to the marked increase in articles in the data set shown in Fig. 1, the Gini jumped by around 0.04 points from 2006 to 2007 and has remained stable at around 0.5 since then. This suggests that the rise in the Gini coefficient may in part be due to the inclusion of lower ranked journals in the Web of Science which receive fewer citations.

2.2 Journal concentration

Concentration on the level of journals has been much discussed. The role of the "Top Five" journals has especially received increasing attention over the last few years (e.g. Card and DellaVigna 2013 and AEA 2017). The share of citations and the share of top articles (ranked by number of citations) presented in Table 2 provides an intuition of the extent of concentration attributable to the "Top Five."[6]

[6]Table 6 in the Appendix provides a list with the 100 most-cited journals.

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Table 2. The 'Top Five' journals in economics, 1956–2016.

	Articles	Citations	Citations per article	Share of articles	Share of citations	Share of top 100 articles	Share of top 500 articles	Share of top 1000 articles
AER	9,704	315,230	32.48	2.31	9.06	12	15.40	14.80
Ectra	4,076	240,788	59.07	0.97	6.92	29	19.00	15.90
JPE	3,530	194,115	54.99	0.84	5.58	18	16.40	13.70
QJE	2,889	146,375	50.67	0.69	4.21	8	9.20	9.60
REStud	2,636	94,325	35.78	0.63	2.71	4	4.60	4.20
Total	22,835	990,833	43.39	5.43	28.47	71	64.60	58.20

Notes. Top 100, 500, and 1000 articles refers to the most-cited articles in the data set.

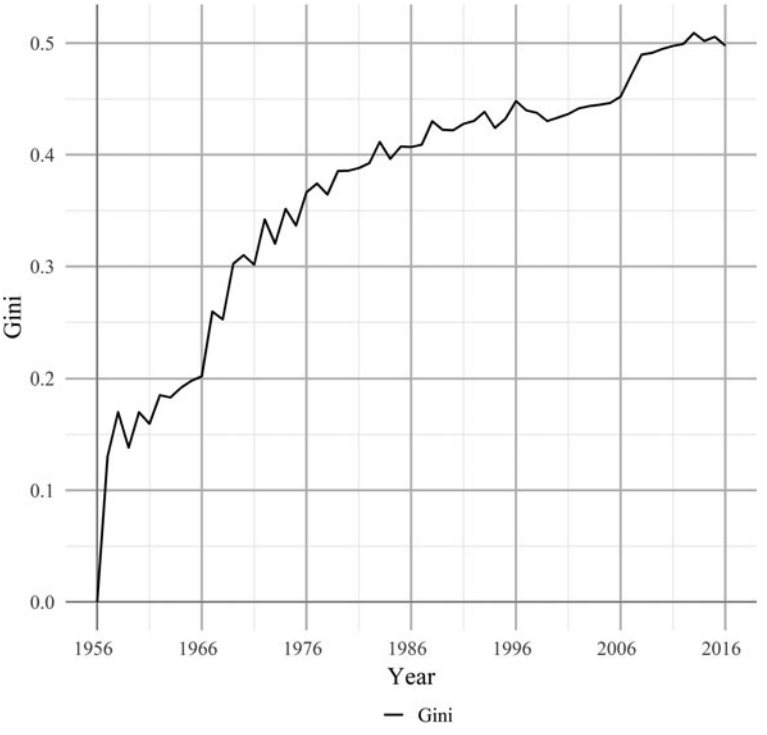

Fig. 5. Gini coefficients for the distribution of citations among the cited articles in the respective year, 1956–2016.

With 9,704 articles, which corresponds to 2.2 percent of all articles in the data set, the *AER* published the most papers in the "Top Five" group. Together, the five journals account for 22,835 articles and close to a million citations – that is 5.4 and 28.5 percent of all articles and citations, respectively. The *AER* received 9.1 percent of all citations, followed by *Ectra* with 6.9 percent, the *JPE* with 5.6 percent, the *QJE* with 4.2 percent, and the *REStud* with 2.7 percent. The concentration is still more pronounced when considering the share of top articles that were published in one of the five journals. Together, they account for 58.2 percent of the 1,000 most-cited articles in economics. Of the top 500 articles, around 64.6 percent were published

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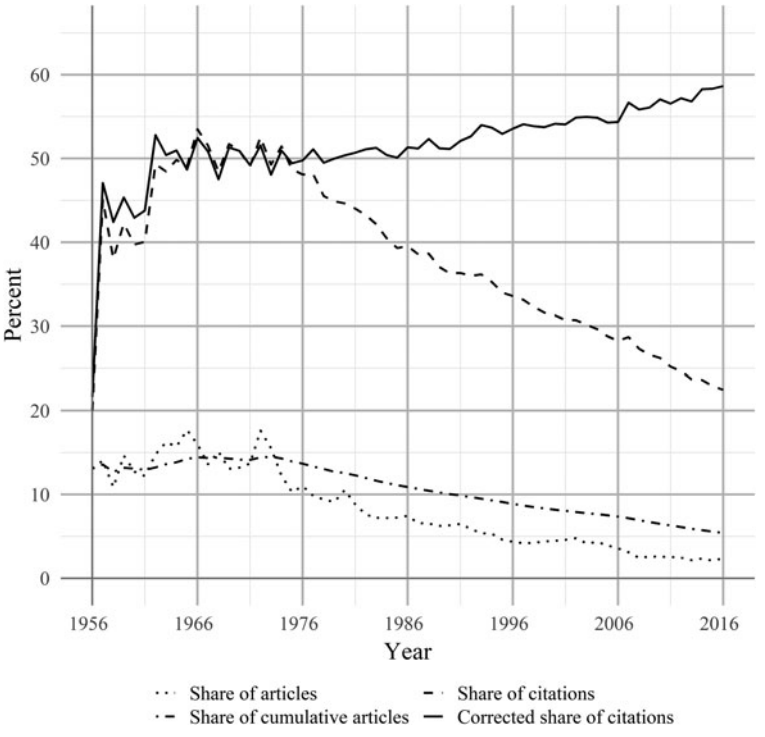

Fig. 6. Share of citations and articles of "Top Five" journals, 1956–2014; corrected share normalized to 1970.

in "Top Five" journals. Of the 100 most-cited articles, they account for 71. Concentration thus increases towards the top of the discipline. Bearing in mind that there are 433 journals in the sample, the substantial concentration of top articles and citations in the "Top Five" is remarkable. It is interesting to note that while the *AER* clearly is the most-cited journal it exhibits the lowest number of citations per article, especially *Ectra* has a significantly higher number of mean citations (59.1 compared to 32.5) and accounts for a larger number of top articles; a tendency that decreases the more articles are included.

The share of articles published in "Top Five" journals each year has been gradually declining since the early 1970s (as illustrated by the dotted line in fig. 6). This is due to the fact that the field of economics is rapidly increasing in size, while the "Top Five" journals face some limit to the quantity of papers they can publish each period. As a consequence also the share of the "Top Five" in the cumulative articles in the data set decreased since then from around 15 percent to around 5 percent in 2016 (dot-dashed line). It is then not surprising that also the share of citations (dashed line) fell from its peak of over 50 to around 23 percent in the same time period. However, correcting for this by dividing the share of citations by the share of "Top Five" articles by all cumulative articles in the data set reveals different dynamics (solid line, normalized to 1970). After a marked increase until 1961, the corrected share remains stable until the mid-1980s. Thereafter, it increases gradually for the rest of the observation period. This suggests that if the number of articles published by the "Top Five" had increased at the same pace as the overall number of articles in the data set, concentration would have risen. The decreasing share of citations going to 'Top Five' journals thus seems to be predominantly driven by the rapid growth of the discipline, rather than changed patterns in the concentration of citations.

The share of top-cited articles published in "Top Five" journals has also been decreasing concurrently with the decrease of their overall share of articles in economics after the early

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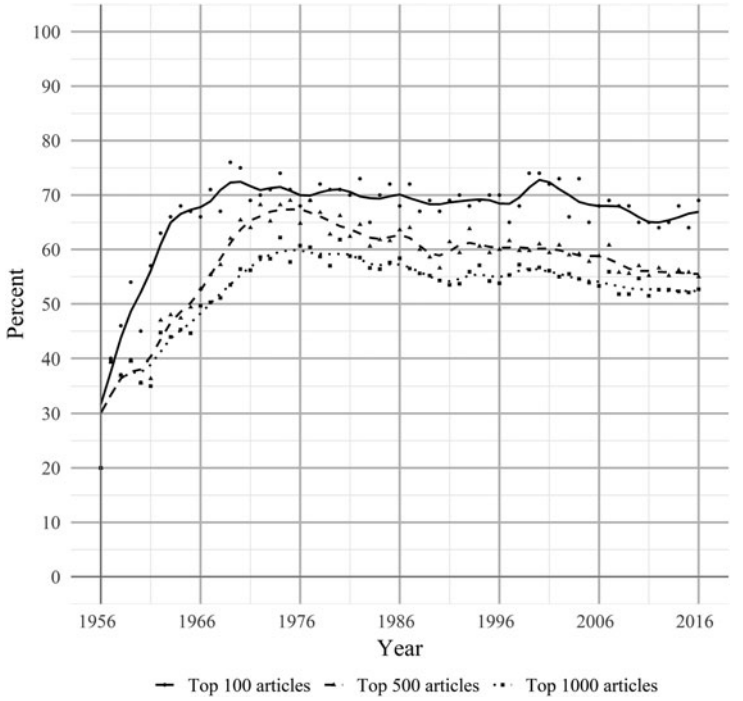

Fig. 7. Share of "Top Five" journals in 100, 500, and 1,000 most-cited articles each year, 5-year weighted moving average, 1956–2016.

1970s (see fig. 7).[7] After steady increases up to that point, the share of the 'Top Five' in the 100, 500, and 1000 most-cited articles each year was around 70, 67, and 60 percent in 1975, respectively. After that, the share in the 500, and 1000 most-cited articles fell continuously to 55, and 52 percent in 2016, respectively. These dynamics are expectable, given the larger competition due to the declining share of the 'Top Five' in the cumulative articles in the data set. In contrast, the share in the 100 most-cited articles was stable for most of the observation period and only started to decline during the early 2000s. In 2016, it was still 67 percent. Again, it is noteworthy that concentration increases towards the top.

Analyzing the distribution of citations along the journal dimension as a whole further substantiates the findings made for the "Top Five". The Gini coefficients of the distribution of citations to cited journals increased rapidly to around 0.78 in 1976 (see fig. 8). Then, for 30 years, the coefficient declined slightly to 0.74 in 2006. As previously seen on the article level, the Gini rose markedly between 2006 and 2007 and was 0.77 in 2016.

2.3 Geographic concentration

Data on affiliation, and thus also regional distribution of authors, from the InCites database allows evaluating geographic concentration. Table 3 shows the number and the share of articles and citations as well as mean citations per article by world regions. Authors affiliated with institutions in North America, i.e. the United States and Canada, are involved in nearly half of all articles (47.3 percent). Western European authors participate in more than a quarter (28.7 percent),

[7]Wherever 5-year weighted moving averages are presented in the figures the current year was weighted with 0.3, the 1-year lead and lag with 0.25, and the 2-year lead and lag with 0.1.

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Table 3. Eight world regions in economics, 1980–2014.

World Region	Articles	Citations	Citations per article	Share of articles[a]	Share of citations[a]
North America	150,339	178,0341	11.84	47.26	72.29
Western Europe	91,404	592,854	6.49	28.73	24.07
Asia	27,065	101,166	3.74	8.51	4.11
Oceania	15,243	67,728	4.44	4.79	2.75
Eastern Europe	14,333	22,117	1.54	4.51	0.90
Middle East	4,981	57,845	11.61	1.57	2.35
Latin America	4,907	16,368	3.34	1.54	0.66
Africa	3,256	7,012	2.15	1.02	0.28
Not Assigned[b]	41,584	146,541	3.52	13.07	5.95

Notes.
[a]The shares do not sum to 100 percent as co-authored articles are counted once for each region.
[b]13.07 percent of articles could not be assigned to a region.

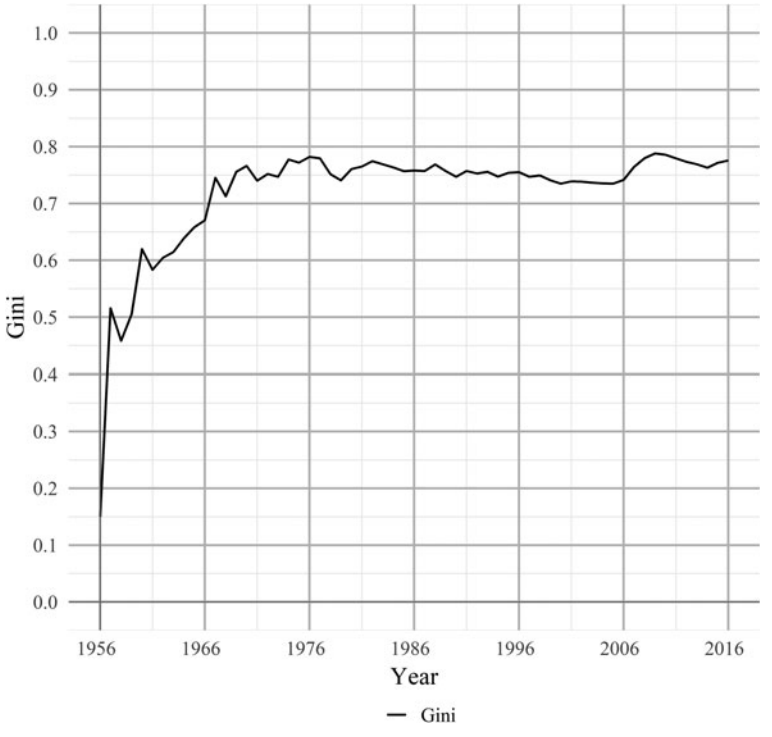

Fig. 8. Gini coefficients of citations to cited journals in the respective year, 1956–2016.

followed by Asia (8.5 percent), Oceania (4.8 percent), and Eastern Europe (4.5 percent). Only around 1.5 in 100 articles are authored by economists in Latin America and in the Middle East, only one is authored by economists in Africa[8].

[8]Table 9 in the appendix lists the top 100 countries, their respective world region and provides detailed statistics for the individual countries. The assignment of countries to regions is largely based on Thomson Reuters' classification, though necessarily arbitrary to some extent.

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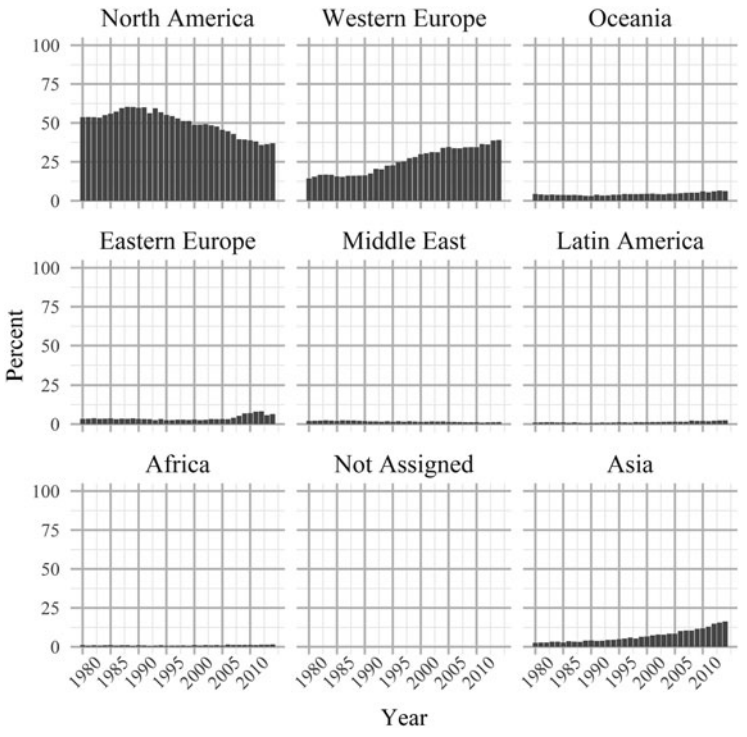

Fig. 9. Share of articles by world region each year, 1980–2014.

While these shares are indicative of concentration and are markedly higher than could be expected from the population of each region, once more, citations display a still stronger concentration. Articles (co-)authored by researchers from North America receive a disproportionately higher share of 72.3 percent of citations. The share of all other regions except the Middle East is disproportionately lower. Eastern Europe, Latin America and Africa together receive a mere 1.84 percent of all citations.

The source of this additional concentration in citations is the substantially different number of mean citations per article between world regions. On average, an article receives 7.7 citations over the observation period. For North America it is 11.8, while it is significantly below the overall average for all other regions apart from the Middle East (11.6), where Israel's high number of citations pushes up the mean.

Figures 9 and 10 illustrate the dynamics of geographic concentration. North America's share of articles has been declining since the 1990s, while Western Europe's share has increased simultaneously. A clear positive trend can also be identified for Asia, to a lesser extent for Oceania, and only recently for Eastern Europe, while Latin America, the Middle East, and Africa barely register on the graph and only show very small increases. Similar trends are observable for the share of citations. Nonetheless, on the level of citations concentration seems to be more persistent, as the share of North America declines more slowly.

2.4 Institutional concentration

To analyze institutional concentration, we identify the top 20 economics departments based on the number of citations they received in total between 1980 and 2014. The data on institutions further adds to the picture of geographic concentration presented above, as 18 of the

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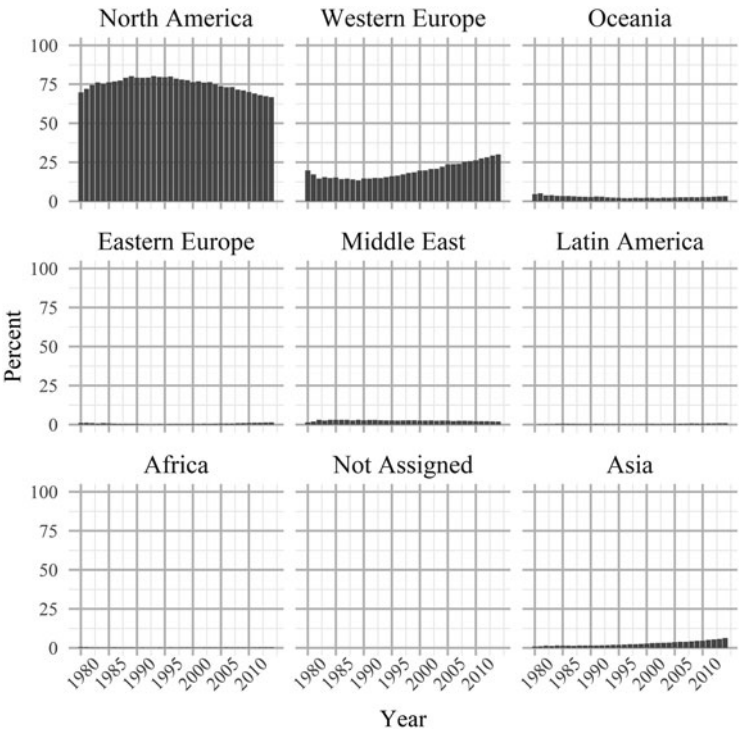

Fig. 10. Share of citations to world region each year, 1980–2014.

20 institutions are located in the United States and two in Great Britain (LSE and Oxford). Table 4 provides an overview.

The numbers indicate a high degree of concentration along the institutional dimension. The top five institutions account for over 16 thousand articles and 480 thousand citations, i.e. 19.5 percent of all citations as well as 48 of the 100 most-cited articles. Harvard University and the University of Chicago alone account for 11 percent of all citations and 30 of the 100 most-cited articles in economics. The top 20 institutions published around 52 thousand articles and received 1.04 million citations during that time period. This corresponds to 16.2 percent of all articles and 42.0 percent of all citations. Almost three quarters (72) of the 100 most-cited articles were published by authors from one of these institutions. The respective shares for the top 500 and top 1000 articles are only slightly lower. The mean number of citations per article for the top 5 (29.3) and top 20 (20.1) institutions is also significantly higher than the overall average of 7.7 for the respective sample.

The share of citations received by these 20 top institutions increased from around 40 percent in the early 1980s to a peak of around 46 percent in 1993, as illustrated in figure 11. Since then, it has been gradually declining to around 40 percent in 2014. As is the case for the "Top Five" journals, the top 20 institutions are limited in their publication capacity. However, their yearly share of published articles (dotted line) remained relatively stable between 1980 and 2004, indicating that they grew simultaneously to the discipline as a whole. Only after 2004 their share in the cumulative articles gradually declined (dot-dashed line). Once more, correcting for this by dividing through their share in the cumulative articles, the share of citations would be stable between 2005 and 2014 (solid line, normalized to 1995).

The share of articles by authors affiliated with a top 20 institution in the 100 and 500 most cited articles has followed similar dynamics (see fig. 12), increasing strongly before the mid-1990s

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Table 4. The top 20 institutions in economics, 1980–2014.

	Institution	Articles	Citations	Citations per article	Share of articles	Share of citations	Share of top 100 articles	Share of top 500 articles	Share of top 1000 articles
1	Harvard	5,410	151,669	28.03	1.70	6.16	13	13.40	12.90
2	Chicago	3,265	119,975	36.75	1.03	4.87	17	13.40	11.50
3	MIT	3,232	105,099	32.52	1.02	4.27	11	8.80	8.40
4	Princeton	2,352	84,992	36.14	0.74	3.45	9	7.60	8.20
5	Stanford	3,453	81,410	23.58	1.09	3.31	6	6.80	6.30
6	Penn State University	3,417	78,414	22.95	1.07	3.18	3	4.00	4.60
7	UC Berkeley	3,952	75,907	19.21	1.24	3.08	5	5.60	4.70
8	Northwestern	2,814	69,172	24.58	0.88	2.81	5	6.20	5.10
9	Yale	2,618	63,140	24.12	0.82	2.56	11	7.20	5.40
10	LSE	3,727	62,003	16.64	1.17	2.52	6	3.20	3.90
11	NYU	2,763	53,513	19.37	0.87	2.17	2	3.80	3.30
12	Columbia	2,910	51,561	17.72	0.91	2.09	5	2.80	2.20
13	UC Los Angeles	2,485	41,300	16.62	0.78	1.68	0	2.00	1.90
14	Michigan	2,127	41,299	19.42	0.67	1.68	0	1.60	1.80
15	Wisconsin Madison	2,317	39,133	16.89	0.73	1.59	2	2.20	2.40
16	Oxford	3,146	38,380	12.20	0.99	1.56	3	1.40	1.60
17	Minnesota TC	2,077	37,125	17.87	0.65	1.51	5	2.60	2.40
18	Maryland CP	2,279	34,508	15.14	0.72	1.40	0	1.40	1.70
19	Cornell	2,687	32,068	11.93	0.84	1.30	0	1.40	1.80
20	Duke University	1,928	27,357	14.19	0.61	1.11	0	0.60	1.00
	Top 5	16,411	480,212	29.26	5.16	19.50	48	43.40	40.40
	Top 20	51,551	1,034,551	20.07	16.21	42.01	72	70.80	68.90

Notes. Citations per article specifies the mean number of citations an article receives. Top 100, 500, and 1000 articles refers to the most-cited articles in the data set.

where it reached around 70 and 69, respectively. Thereafter, it remained roughly constant. Only since 2012, the share of articles in the top 100 articles declined from 70 to 66 articles. The share of articles in the 1,000 most cited articles increased over the entire observation period from around 36 percent to 70 percent in 2016. Again, concentration is consistently higher towards the top of the discipline with the exception of the most recent years.

2.5 Author concentration

Investigating concentration on the level of authors poses a challenge, as Web of Science data only includes the last names and first name initials for most entries. Name disambiguation based purely on initials may lead to distorted results (Kim and Diesner 2016). One source of problems is, for instance, that an author may be included in the data set once with and once without his or her

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Fig. 11. Share of articles and citations of top-20 institutions, 1980–2014 (corrected share normalized to 1995).

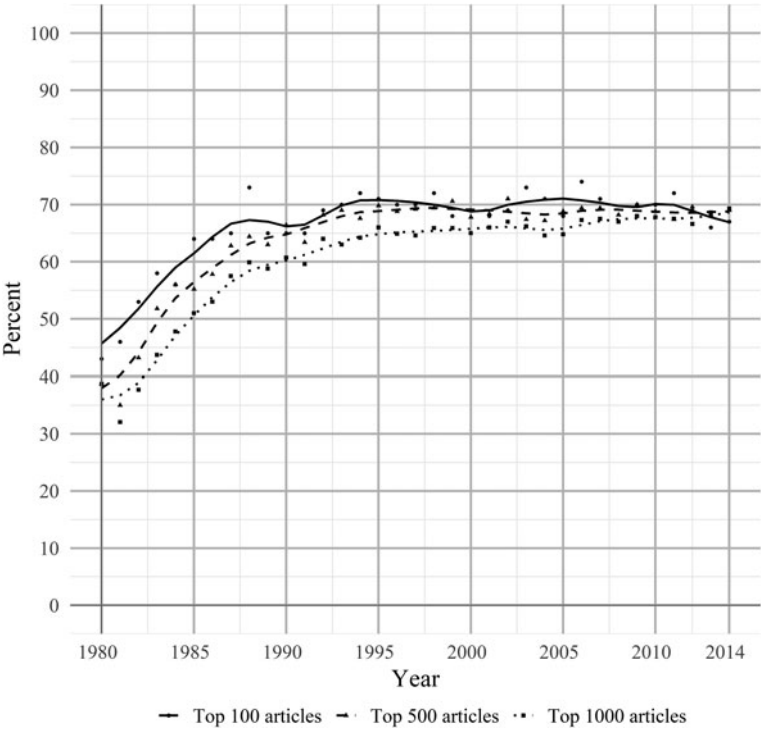

Fig. 12. Share of top 20 institutions in the 100, 500, 1000 most-cited articles each year, 5-year weighted moving average, 1980–2014.

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Table 5. Overview on the top 10 and 100 authors, 1956–2016.

	Top 10 authors	Top 100 authors
Articles	1,057	7,695
Citations	119,648	540,064
Citations per article	113.20	70.18
Share of articles	0.25	1.83
Share of citations	3.44	15.52
Share of top 100 articles	17	69
Share of top 500 articles	13.00	52.60
Share of top 1000 articles	10.70	44.20

Notes. A full list of the 100 top authors can be found in table 8 in the appendix.

middle name initial. Therefore, we manually checked the 100 most-cited authors in order to identify cases in which an author is mistakenly included in the data with two slightly distinct names. Where it was possible to unreservedly confirm that two versions of a name referred to the same author, the data was matched accordingly. The concentration measures reported below should thus be regarded as the lower limit and may be higher in reality. Table 5 shows aggregated measures of concentration for the top 10 and top 100 authors in the data set. Measures for the individual authors can be found in table 8 in the appendix.

The top 10 authors alone published over a thousand articles (0.25 percent) which were cited nearly 120 thousand times, that is 3.4 percent of all citations. The top 100 authors published close to 7,700 articles (1.8 percent) which received more than half a million citations, that is 15.5 percent of all citations. The most-cited author, Andrei Shleifer, alone received 17,613 citations which corresponds to around one in every 200 citations.

On average, an article published by a top-ten author received 113.2 citations, an article published by a top-100 author received 69.5. The numbers vary between 472.9 (Michael Jensen [35]) and 22.0 (Amartya Sen [89]), the latter being only around thrice the overall mean citations per article in our data set (8.2), which is an indicator of the high productivity of top authors in terms of quantity. These top 10 and top 100 authors account for 17 and 69 percent of the top 100 articles, 13 and 52.6 percent of the top 500 articles, and 10.7 and 44.2 percent of the top 1000 articles, respectively. Once more, concentration is higher at the top of the discipline.

2.6 Paradigmatic concentration

To analyze paradigmatic concentration, the journals were coded with the Heterodox Economics Directory into a mainstream and a heterodox group. Table 6 shows the number of journals, articles and citations by each group. This overview reveals that schools of thought that diverge from the mainstream find less journals to publish in and account for only a small fraction of articles (8.1 percent) and citations (2.8 percent). On average papers in heterodox journals are cited 3.1 times compared to 9.4 times in mainstream journals. None of the 1,000 most-cited articles was published in a heterodox journal, and only 0.56 and 0.96 percent were published in the top 5000 and 10,000 respectively.

Figure 13 shows the share of articles published in heterodox journals and the share of citations these journals received each year. While heterodox schools of thought still played a significant role before the 1970s, their importance rapidly declined thereafter. The share of articles (dotted line), along with the share of cumulative articles (dot-dashed line), fell from around 16 percent to

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Table 6. Overview on paradigms in economics, 1956–2016.

	Mainstream[a]	Heterodox[b]	Total
Journals	344	40	384
Articles	352,979	30,982	383,961
Citations	3,321,121	95,334	3,416,455
Citations per article	9.41	3.08	8.90
Share of articles	91.93	8.07	100
Share of citations	97.21	2.79	100
Share of top 100 articles	100	0	100
Share of top 500 articles	100	0	100
Share of top 1000 articles	100	0	100
Share of top 5000 articles	99.44	0.56	100
Share of top 10000 articles	99.04	0.96	100

Notes.
[a]Refers to all journals that are in the Web of Science subject category economics but are not listed in the Heterodox Economics Directory.
[b]Refers to all journals that are in the Web of Science subject category economics and are listed in the Heterodox Economics Directory.

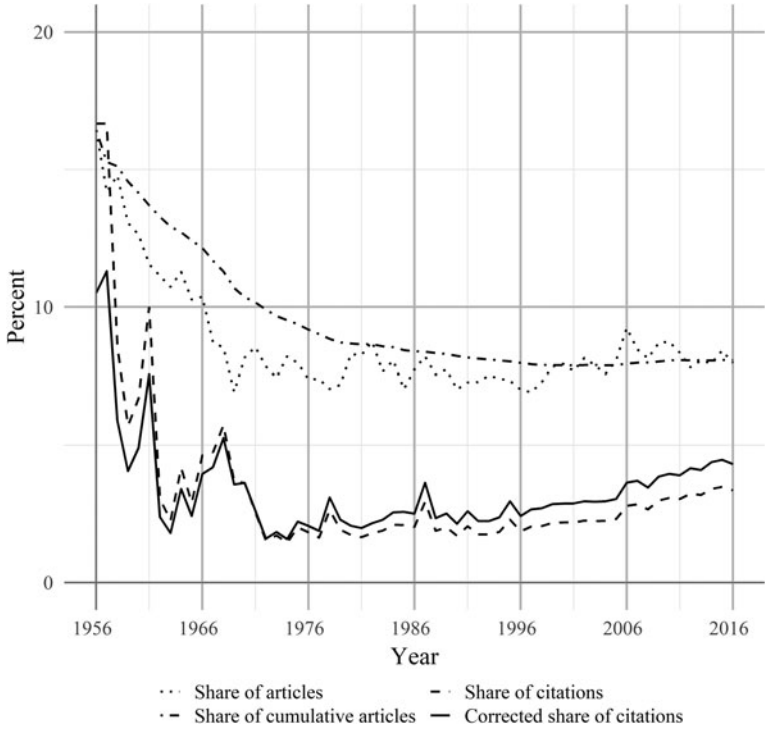

Fig. 13. Share of heterodox articles and citations, 1956–2016 (corrected share normalized to 1970).

around 8 percent until 1970, where it has remained stable ever since. The share of citations (dashed line) fell steeply from the same level to around 2 percent in this time period. Only during the last decade the share rose again notably to close to 3.5 percent. Correcting for the declining

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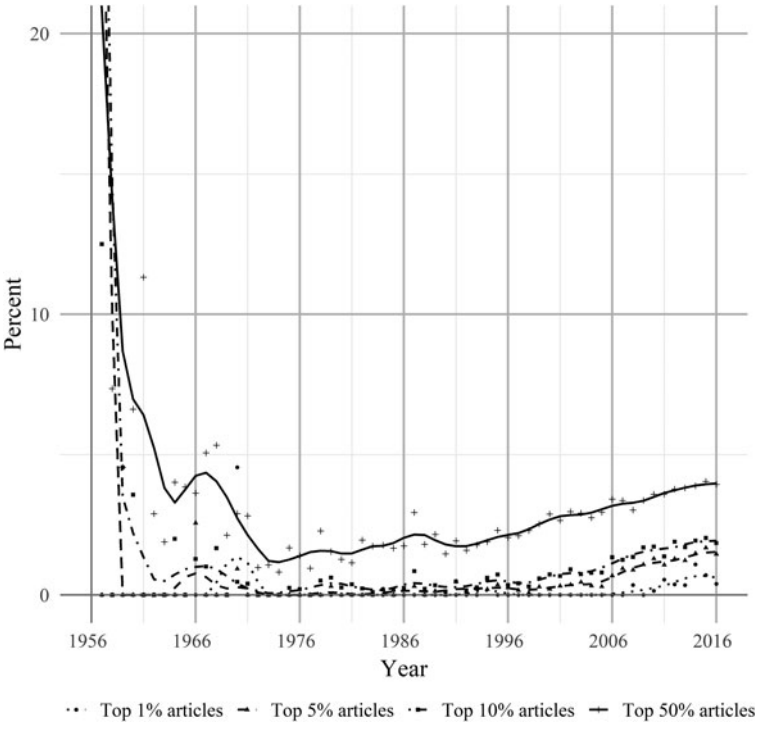

Fig. 14. Share of top 1, 5, 10, and 50 percent of articles that were published in heterodox journals, 1956–2016.

share in the cumulative articles in the data set would yield a slightly stronger increasing dynamics (solid line, normalized to 1970).

Figure 14 shows the share of heterodox articles in the top 1, 5, 10, and 50 percent of articles each year. Similarly to before, the shares sharply decreased from high levels until the 1970s. From then until the mid-1990s the share of heterodox articles was 0 percent for the top 1, 5, and 10 percent. The shares for the top 1 percent only started to increase slowly after the financial crises 2008 in 2010. In 2016 the shares reached 0.6, 1.6, 2, and 4 percent, respectively.

3. Discussion

While previous studies have mostly focused on single aspects of concentration, this article provides a comprehensive picture by investigating six dimensions of concentration in economics: article concentration, journal concentration, geographic concentration, institutional concentration, author concentration, and paradigmatic concentration. Moreover, by investigating a large-scale data set covering all articles published in economics journals listed in the Web of Science over the last six decades, this study allows us to discuss trends and draw conclusions for the discipline as a whole. Some general features may be inferred.

- Economics is strongly concentrated along all investigated dimensions. The overall distribution of citations to articles is very unequal with a corresponding Gini of 0.82 (when only considering articles that were cited at least once it is still 0.71). The results showed that 35.9 percent of all articles received 0 citations, which is higher than the rate of "dry holes" found by Laband and Tollison (2003) of around a quarter (though it needs to be noted that our analysis only includes intra-economics citations). On the journal level the concentration is still more pronounced and the "Top Five" journals out of 433 alone account for 28.5

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percent of all citations and 71 of the 100 most-cited articles. North America dominates the discourse in economics with around half of all articles authored and three quarters of all citations received over the entire observation period. Western Europe accounts for around 29 percent of articles and almost a quarter of citations. All other regions in our analysis play a minor role. Also institutional and author concentration are substantial. Out of 4,337 academic institutions listed in Thomson Reuter's InCites, the top 20 alone author 16.2 percent of all articles and receive 42 percent of all citations, confirming tendencies found by other authors (see e.g. Kocher and Sutter 2001; Hodgson and Rothman 1999; and Fourcade et al. 2015). The 10 and 100 most-cited authors received around 120 thousand and 540 thousand citations, corresponding to 3.4 and 15.5 percent of all citations, respectively. Finally, economics is also paradigmatically concentrated. Heterodox economics accounts for only 40 of 344 journals, 8 percent of articles, 2.8 percent of citations and not a single one of the 1,000 most-cited articles.

- Concentration on the level of citations tends to be more pronounced and more persistent compared to the article level. While both the share of articles and the share of citations are concentrated along the six dimensions, the share of citations tends to be higher in each of the dimensions. The particularly strong concentration in terms of the share of citations is due to the fact that those journals, regions, institutions, authors, or paradigms that account for a larger share of articles also have a higher mean number of citations per article. For instance, on the level of geographic concentration, North America's share of citations fell significantly less than its share of all articles.
- Concentration tends to increase towards the top of the discipline. For example, the share of the "Top Five" journals, top 20 institutions, or top 100 authors is higher in the 100 most-cited articles than in the 500, or 1,000 most-cited articles. One possible explanation for this may be the Matthew effect, that academic recognition in the form of citations and prestige are mutually reinforcing (Merton 1968; Tol 2013), though Birkmaier and Wohlrabe (2014)'s results on the author level suggest that the Matthew effect may in fact wear of with an increasing number of citations.
- The strongest increases in concentration occurred before the 1970s. Both on the level of articles and journals the Gini coefficient increased markedly until the 1970s, followed by a long period with slower increases in the Gini coefficients. Between 2006 and 2007 the coefficients rose significantly again, concurrently to the pronounced increase in the number of articles in the data set. Also the share of citations reaped by the top 1, 5, 10, and 50 percent of articles has been steadily increasing throughout the observation period. These dynamics differ from the results of Larivière et al. (2009) for the natural sciences and engineering, medical fields, social sciences, and the humanities as a whole, who found decreasing concentration across disciplines between 1990 and 2007.
- On the level of geographic concentration, North America's shares of articles and citations have declined since the 1990s, mostly in favor of Western Europe and to lesser extent Asia. This is in line with the results of Coupé (2003) and Sutter and Kocher (2001) who find rising shares of (continental) European authors starting in the 1990s for a selection of journals. It may further be considered a trend reversal to Kalaitzidakis et al. (1999), who find no evidence of an increase in articles published by European authors between 1971 and 1994. The shares of articles and citations of all other regions remain low - recent trends indicate only slow change.
- Also the temporal dynamics of paradigmatic concentration are insightful. Both the overall share of heterodox articles and the share of heterodox articles in the most-cited papers plummeted before the early 1970s. The share of citations fell by around 15 percent during this period. In the following decades, heterodox economics was largely disregarded, receiving only around 2 percent of citations and accounting for nearly none of the 1, 5, or 10 most-cited percent of articles. This is consistent with the analysis that the importance of

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heterodox schools of thought decreased until the 1970s (Lee 2004; Stockhammer and Ramskogler 2012). After 30 years during which little changed in the position of heterodox economics, there is a small upward trend in the share of citations during the last decade. Also the share of heterodox articles at the top of the discipline increased gradually. After the financial crisis there are heterodox articles among the top 1 percent for the first time in decades. While this does suggest that the crisis did have an impact on academic economics, the results of Aigner et al. (2018) indicate that this impact was rather temporary and did not entail a substantial paradigmatic shift.

- Despite the growth of the discipline, the influence of a fixed number of top journals and institutions remains remarkably stable. The number of journals in the data set increased from 35 in 1956 to 384 in 2016. Yet, the share of articles from the "Top Five" in the 100 most-cited articles each year has remained stable over time. The decreasing share of citations received by these journals may be attributed to their declining share in the cumulative articles in the data set. When correcting for this, the share increased steadily over the last 30 years. Similarly, despite a rising number of institutions up to 4,337, the share of citations going to the top twenty institutions only fell by 5 percent over the last 25 years, and when correcting for the increasing number of articles it indeed remained on its high level. The share of top 20 institutions in the 1000 most-cited articles each year has increased from 60 percent to 70 percent during the same time period. Only since 2012 did their share of articles in the top 100 articles decline from 70 to 66 articles. One source of this institutional concentration may be the fact that personal ties between authors and editors increase the chance of publication (Laband and Piette 1994; Medoff 2003). While Laband and Piette (1994) as well as Medoff (2003) suggest that this "favoritism" does not necessarily lead to the publication of lower quality articles, Hodgson and Rothman (1999) worry that this situation might be a barrier for innovative research in economics. At least in part, concentration on the institutional level may, however, also be the result of a process of self-selection, where the best authors join the best and most reputable departments. In turn these departments will enjoy an even better reputation and attract more top-tier authors and so forth.

This article presents aggregate results for concentration in economics along six dimensions. Interactions between these dimensions have thus far not been investigated. The general feature that concentration increases towards the top of the discipline suggests that concentration may be even higher at the intersections of the dimensions. Furthermore, the contributions of each of these dimensions to the stratification of the discipline may be analyzed and a dynamic perspective on the author concentration could be added to this research. Also switching the perspective by investigating the citation behavior and patterns of particular journals, regions, institutions, authors, and paradigms seems promising for understanding the underlying dynamics that lead to the concentration of economics. Finally, using social network analysis and applying text-mining methods to the keywords and abstracts of the articles may allow further insights into the structure of the discipline.

4. Conclusion

The constitution of economics as a discipline has been much debated over the last few decades. The failure of economics to predict the financial and economic crisis has further fueled this discussion (Colander 2011). In this debate, concentration of the discipline is key, as it may lead to an intellectual "lock-in", where an elite within economics, consisting of a limited number of journals, regions, institutions, authors, or countries, may shield it from new approaches and ideas (Hodgson and Rothman 1999). The dominant position of such an elite is reinforced by path-dependencies and network effects (Sterman and Wittenberg 1999; Merton 1968). For instance,

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following unwritten rules and codes (Fourcade et al. 2015) or adhering to the dominant paradigm may often be essential for publication in certain journals, for obtaining tenure, or for earning research funds (Kapeller 2010).

Moreover, not only may concentration lead to intellectual "lock-in", but economics may also be "locked in concentration", as "economists … tend to see institutionalized hierarchies as emergent, truthful indicators of some underlying worth, and consequently are obsessed with them" (Fourcade et al. 2015, 98). The fact that there is more data and research about rankings in economics than in all other social sciences may indicate that economists may be equating concentration with quality (Fourcade et al. 2015).[9] These rankings based on citation metrics may not effectively measure the quality of the research (Frey and Rost 2010; Laband 2013) and may further act as an amplifier of existing modes of hierarchy formation (Dobusch and Kapeller 2009). They can produce an incentive structure in which economists, who place high value on the impact of a journal within the economics profession (Liebowitz and Palmer 1984), may be deterred from publishing on critical issues that are considered to lie outside of the core of the discipline such as climate change or health (Hudson 2013).

This study provides a quantitative overview on the level and dynamics of concentration in economics along six dimensions. The results indicate that the discipline is highly concentrated and that concentration has been increasing over the last six decades. Recent trends do not prompt the conclusion that these overall dynamics will soon reverse, though concentration has stopped increasing or even slightly declined along some dimensions. The danger this persistent concentration entails for discipline's ability to change and to embrace alternative approaches and innovation was pointedly summarized by George Akerlof (2017) in his recent panel address at the 2017 ASSA conference:

> "What I am worried about most of all is what we don't see. So, I am worried about the analysis that is never seen, that never becomes a paper. And it doesn't become a paper, because it can't become a paper. And it can't become a paper, because that's not what a paper in economics is all about." (Akerlof 2017)

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[9]Already in 1989, Colander (1989, 137) suggested that he could not provide a full survey of all papers on rankings in economics as a "bibliography, by itself, would take up the entire space allocated for this article." Proposals to measure journal quality based on the number of articles published by the seven highest-rated economics departments (Rupp and McKinney 2002) lend support to the argument that economists may see institutionalised hierarchies as truthful indicators of quality.

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Appendix

Table 7. Overview on research items.

Research Item[a]	Frequency	Citations	Citations per item	Items with 0 citations	Removed items	Removed citations
Article	**375,571**	**3,154,999**	**8.40**	**130,809**	**0**	**375,571**
Article; Proceedings Paper	**20,192**	**215,260**	**10.66**	**4,779**	**0**	**20,192**
Note	**18,618**	**70,188**	**3.77**	**10,661**	**0**	**18,618**
Review	**4,925**	**68,507**	**13.91**	**1,843**	**0**	**4,925**
Article; Book Chapter	**508**	**2,072**	**4.08**	**167**	**0**	**508**
Software Review	**363**	**270**	**0.74**	**258**	**0**	**363**
Review; Book Chapter	**36**	**576**	**16.00**	**4**	**0**	**36**
Article; Retracted Publication	**4**	**5**	**1.25**	**0**	**0**	**4**
Database Review	**2**	**0**	**0.00**	**2**	**0**	**2**
Hardware Review	**2**	**0**	**0.00**	**2**	**0**	**2**

(*Continued*)

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Table 7. (*Continued*)

Research Item[a]	Frequency	Citations	Citations per item	Items with 0 citations	Removed items	Removed citations
Book Review	*126,692*	*4,796*	*0.04*	*124,325*	*126,651*	*126,692*
Editorial Material	*17,910*	*20,546*	*1.15*	*12,854*	*17,478*	*17,910*
Meeting Abstract	*10,358*	*1,013*	*0.10*	*10,013*	*10,347*	*10,358*
Letter	*3,162*	*6,970*	*2.20*	*1,800*	*3,022*	*3,162*
Discussion	*1,758*	*762*	*0.43*	*1,392*	*1,753*	*1,758*
Editorial Material; Book Chapter	*8*	*1*	*0.12*	*7*	*8*	*8*
Correction	1,266	529	0.42	1,069	1,266	1,266
Correction, Addition	1,055	872	0.83	808	1055	1,055
Biographical-item	1,013	193	0.19	903	1013	1,013
Item About An Individual	747	380	0.51	610	747	747
News Item	376	9	0.02	373	376	376
Reprint	177	294	1.66	133	177	177
Bibliography	121	228	1.88	114	121	121
Chronology	2	0	0.00	2	2	2
Abstract Of Published Item	1	1	1.00	0	1	1
Fiction, Creative Prose	1	1	1.00	0	1	1
All items	584,868	3,548,472	2.71	302,928	164,018	584,868

Notes.
[a]Items in **bold** are included in the data set. Items in *italics* are included above the threshold of 10 citations. All other items are not included.

Table 8. Top 100 Authors, 1956–2016.

Rank	Author	Citations	Articles	Citations per article	Rank	Author	Citations	Articles	Citations per article
1	Shleifer A	17,613	132	133.43	51	Andrews DWK	5,689	81	70.23
2	Stiglitz JE	16,927	226	74.90	52	Arellano M	5,529	27	204.78
3	Heckman JJ	14,171	147	96.40	53	Deaton A	5,456	71	76.85
4	Engle RF	13,346	86	155.19	54	Summers LH	5,444	91	59.82
5	Barro RJ	13,289	101	131.57	55	Akerlof GA	5,422	54	100.41
6	Lucas RE	12,678	87	145.72	56	West KD	5,414	44	123.05
7	Becker GS	11,318	70	161.69	57	Shin YC	5,333	53	100.62
8	Fama EF	10,987	63	174.40	58	Feldstein M	5,327	171	31.15
9	Tirole J	9,948	149	66.77	59	Rosen S	5,305	57	93.07
10	Vishny RW	9,665	50	193.30	60	Diebold FX	5,295	69	76.74
11	Stock JH	9,579	70	136.84	61	Sims CA	5,273	65	81.12
12	Granger CWJ	9,434	95	99.31	62	Fehr E	5,222	82	63.68
13	Phillips PCB	9,094	210	43.30	63	Sargent TJ	5,209	123	42.35
14	Milgrom P	8,471	59	143.58	64	Grossman SJ	5,193	30	173.10

(*Continued*)

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Table 8. (*Continued*)

Rank	Author	Citations	Articles	Citations per article	Rank	Author	Citations	Articles	Citations per article
15	Acemoglu D	8,294	141	58.82	65	Murphy KM	5,192	51	101.80
16	Hausman JA	8,147	93	87.60	66	Romer PM	5,053	29	174.24
17	Helpman E	7,969	98	81.32	67	Grossman GM	5,053	69	73.23
18	Johansen S	7,897	36	219.36	68	Hamilton JD	5,024	52	96.62
19	Levine R	7,895	59	133.81	69	Maskin E	5,021	76	66.07
20	Prescott EC	7,591	67	113.30	70	Tversky A	5,016	14	358.29
21	Lopezdesilanes F	7,553	35	215.80	71	Hansen BE	5,008	85	58.92
22	Laporta R	7,459	28	266.39	72	Thaler RH	4,963	55	90.24
23	Pesaran MH	7,440	123	60.49	73	Jorgenson DW	4,885	108	45.23
24	Campbell JY	7,195	69	104.28	74	Krueger AB	4,839	65	74.45
25	Bollerslev T	7,190	55	130.73	75	Bernanke BS	4,830	39	123.85
26	White H	7,135	97	73.56	76	Arrow KJ	4,789	69	69.41
27	Gertler M	7,094	50	141.88	77	King RG	4,768	43	110.88
28	Newey WK	7,031	69	101.90	78	Schmidt P	4,754	100	47.54
29	Kahneman D	7,026	26	270.23	79	Kreps DM	4,707	26	181.04
30	Alesina A	7,008	93	75.35	80	Merton RC	4,617	19	243.00
31	Griliches Z	6,974	81	86.10	81	Stigler GJ	4,516	55	82.11
32	Hansen LP	6,891	64	107.67	82	Fudenberg D	4,403	95	46.35
33	Blundell R	6,810	109	62.48	83	Besley T	4,402	100	44.02
34	Krugman P	6,713	70	95.90	84	Stulz RM	4,386	74	59.27
35	Jensen MC	6,621	14	472.93	85	Shapiro C	4,353	47	92.62
36	Hall RE	6,547	86	76.13	86	List JA	4,321	151	28.62
37	Glaeser EL	6,416	96	66.83	87	Johnson S	4,310	58	74.31
38	Mankiw NG	6,285	77	81.62	88	Samuelson PA	4,300	138	31.16
39	French KR	6,285	31	202.74	89	Sen A	4,274	194	22.03
40	Perron P	6,266	61	102.72	90	Laffont JJ	4,226	153	27.62
41	La Porta R	6,215	36	172.64	91	Rosenzweig MR	4,181	94	44.48
42	Blanchard OJ	6,176	87	70.99	92	Rabin M	4,133	41	100.80
43	Hart OD	6,122	57	107.40	93	Ross SA	4,115	37	111.22
44	Aghion P	5,949	94	63.29	94	Shiller RJ	4,064	67	60.66
45	Gali J	5,885	52	113.17	95	Zingales L	4,028	44	91.55
46	Solow RM	5,874	62	94.74	96	Jovanovic B	3,995	71	56.27
47	Dixit A	5,851	97	60.32	97	Calvo GA	3,982	86	46.30
48	Diamond PA	5,839	89	65.61	98	Easterly W	3,977	51	77.98
49	Rogoff K	5,837	73	79.96	99	Card D	3,967	76	52.20
50	Watson MW	5,692	68	83.71	100	Rodrik D	3,958	73	54.22

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Table 9. Top 100 Countries, 1980–2014.

Rank	WR	Country	Citations	Articles	Citations per article	Rank	WR	Country	Citations	Articles	Citations per article
1	NA	USA	1,690,298	136,468	12.39	51	A	Sri Lanka	347	87	3.99
2	WE	UK	239,528	25,257	9.48	52	ME	Kuwait	345	65	5.31
3	NA	Canada	146,648	17,732	8.27	53	LA	Uruguay	313	114	2.75
4	WE	France	71,599	12,020	5.96	54	LA	Peru	309	147	2.10
5	WE	Netherlands	68,714	11,511	5.97	55	A	Ghana	308	112	2.75
6	O	Australia	58,348	13,195	4.42	56	EE	Estonia	286	162	1.77
7	ME	Israel	57,085	4,715	12.11	57	LA	Costa Rica	249	69	3.61
8	WE	Italy	48,193	9,745	4.95	58	A	Malawi	249	68	3.66
9	WE	Spain	47,985	9,407	5.10	59	A	Cote Ivoire	248	49	5.06
10	WE	Sweden	39,183	5,257	7.45	60	EE	Croatia	243	300	0.81
11	WE	Belgium	38,415	5,371	7.15	61	A	Uganda	208	77	2.70
12	A	Japan	27,650	7,488	3.69	62	EE	Bulgaria	195	129	1.51
13	WE	Denmark	26,744	3,426	7.81	63	LA	Venezuela	190	65	2.92
14	WE	Germany	26,386	6,928	3.81	64	A	Zambia	187	54	3.46
15	WE	Norway	19,082	3,244	5.88	65	O	Fiji	183	86	2.13
16	A	Hong Kong	19,010	3,083	6.17	66	LA	Bolivia	181	33	5.48
17	WE	Switzerland	16,836	2,248	7.49	67	A	Vietnam	178	140	1.27
18	A	South Korea	13,748	3,451	3.98	68	A	Nepal	175	45	3.89
19	A	Taiwan	11,942	3,895	3.07	69	ME	Lebanon	168	63	2.67
20	O	New Zealand	10,213	2,198	4.65	70	LA	Ecuador	166	39	4.26
21	A	India	10,042	2,266	4.43	71	A	Morocco	158	52	3.04
22	WE	Ireland	9,199	1,800	5.11	72	A	Cameroon	151	76	1.99
23	WE	Finland	9,092	2,237	4.06	73	EE	Latvia	142	87	1.63
24	WE	Portugal	8,748	1,805	4.85	74	LA	Barbados	137	44	3.11
25	A	Singapore	8,374	1,900	4.41	75	LA	Jamaica	129	52	2.48
26	WE	Greece	7,221	1,990	3.63	76	A	Senegal	128	47	2.72
27	EE	Turkey	7,035	2,409	2.92	77	A	Macau	113	42	2.69
28	LA	Brazil	5,710	1,833	3.12	78	A	Mozambique	111	28	3.96
29	LA	Mexico	4,491	1,149	3.91	79	A	Madagascar	108	11	9.82
30	WE	Austria	4,005	853	4.70	80	A	Botswana	104	44	2.36
31	EE	Czech R	3,624	2,266	1.60	81	LA	Nicaragua	83	20	4.15
32	A	South Africa	3,031	1,837	1.65	82	LA	Guadeloupe	81	11	7.36
33	LA	Argentina	2,615	905	2.89	83	ME	Oman	77	30	2.57
34	EE	Hungary	2,545	1,027	2.48	84	A	Burkina F	67	18	3.72
35	EE	Russia	2,367	901	2.63	85	A	Sudan	66	21	3.14
36	EE	Poland	2,217	1,233	1.80	86	WE	Malta	64	16	4.00
37	LA	Colombia	1,400	387	3.62	87	LA	Trinidad T	61	28	2.18
38	EE	Romania	1,176	1,187	0.99	88	A	Algeria	59	21	2.81

(*Continued*)

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Table 9. (*Continued*)

Rank	WR	Country	Citations	Articles	Citations per article	Rank	WR	Country	Citations	Articles	Citations per article
39	EE	Slovakia	1,106	1,260	0.88	89	A	Mali	59	12	4.92
40	WE	Luxembourg	1,080	321	3.36	90	LA	Honduras	53	16	3.31
41	A	Malaysia	984	646	1.52	91	ME	Qatar	53	36	1.47
42	WE	Iceland	656	138	4.75	92	A	Niger	51	18	2.83
43	EE	Czechoslovakia	627	2,033	0.31	93	LA	Guatemala	47	29	1.62
44	A	Pakistan	510	381	1.34	94	A	Benin	46	18	2.56
45	A	Nigeria	473	287	1.65	95	A	Kazakhstan	45	90	0.50
46	A	Zimbabwe	450	97	4.64	96	WE	Reunion	45	16	2.81
47	EE	Ukraine	415	1,287	0.32	97	ME	Jordan	41	23	1.78
48	EE	Yugoslavia	407	93	4.38	98	ME	Iraq	40	12	3.33
49	LA	Bermuda	391	3	130.33	99	A	Uzbekistan	39	17	2.29
50	A	Tanzania	356	110	3.24	100	A	Mauritius	36	28	1.29

Notes. WR: World Region, NA: North America, WE: Western Europe, O: Oceania, ME: Middle East, AS: Asia, EE: Eastern Europe, LA:Latin America, AF: Africa.

Table 10. Top 100 Journals, 1956–2016.

Rank	Journal	Citations	Articles	Citations per article
1	American Economic Review	315,230	9,704	32.48
2	Econometrica	240,788	4,076	59.07
3	Journal Of Political Economy	194,115	3,530	54.99
4	Quarterly Journal Of Economics	146,375	2,889	50.67
5	Journal Of Financial Economics	96,005	2,440	39.35
6	Review Of Economic Studies	94,325	2,636	35.78
7	Review Of Economics And Statistics	89,730	4,754	18.87
8	Journal Of Econometrics	81,124	3,550	22.85
9	Journal Of Economic Theory	78,374	4,122	19.01
10	Journal Of Monetary Economics	70,426	2,440	28.86
11	Economic Journal	69,891	4,190	16.68
12	Rand Journal Of Economics	59,787	1,900	31.47
13	Journal Of Public Economics	58,481	3,314	17.65
14	American Journal Of Agricultural Economics	50,824	6,350	8.00
15	Journal Of International Economics	49,949	2,348	21.27
16	Journal Of Economic Literature	47,333	793	59.69
17	European Economic Review	45,476	3,560	12.77
18	Journal Of Economic Perspectives	43,283	1,372	31.55

(*Continued*)

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Table 10. (*Continued*)

Rank	Journal	Citations	Articles	Citations per article
19	Economics Letters	43,230	10,090	4.28
20	Review Of Financial Studies	42,679	1,591	26.83
21	International Economic Review	35,549	2,217	16.03
22	Journal Of Development Economics	35,090	2,576	13.62
23	Journal Of Banking Finance	34,653	4,385	7.90
24	Journal Of Finance	32,740	991	33.04
25	World Development	32,729	5,275	6.20
26	Journal Of Money Credit And Banking	30,397	2,418	12.57
27	Journal Of Business Economic Statistics	28,130	1,425	19.74
28	Journal Of Environmental Economics And Management	28,021	1,765	15.88
29	Journal Of Urban Economics	27,302	1,991	13.71
30	Applied Economics	26,742	7,591	3.52
31	Journal Of Law Economics	25,540	1,345	18.99
32	Journal Of Human Resources	25,235	1,795	14.06
33	Journal Of Economic Dynamics Control	25,045	3,001	8.35
34	Journal Of Economic Behavior Organization	23,953	3,412	7.02
35	Ecological Economics	22,973	3,959	5.80
36	Journal Of Labor Economics	21,825	1,027	21.25
37	Journal Of Applied Econometrics	21,114	1,294	16.32
38	Games And Economic Behavior	20,820	2,183	9.54
39	Economic Inquiry	20,735	2,818	7.36
40	Public Choice	20,537	3,503	5.86
41	Journal Of Financial And Quantitative Analysis	19,769	2,180	9.07
42	Journal Of Health Economics	19,661	1,720	11.43
43	Economica	19,105	2,012	9.50
44	Oxford Bulletin Of Economics And Statistics	17,744	1,746	10.16
45	Canadian Journal Of Economics Revue Canadienne D Economique	17,533	2,763	6.35
46	Energy Economics	17,139	2,876	5.96
47	Southern Economic Journal	16,348	4,111	3.98
48	Oxford Economic Papers New Series	16,112	1,876	8.59
49	Land Economics	15,886	2,718	5.84
50	Journal Of Industrial Economics	15,533	1,571	9.89
51	Regional Studies	14,763	2,859	5.16
52	Transportation Research Part B Methodological	14,272	2,158	6.61
53	International Journal Of Industrial Organization	14,121	1,590	8.88
54	Manchester School	14,045	3,726	3.77

(*Continued*)

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Table 10. (*Continued*)

Rank	Journal	Citations	Articles	Citations per article
55	Scandinavian Journal Of Economics	13,860	1,847	7.50
56	Journal Of Economic History	13,858	2,296	6.04
57	Econometric Theory	13,341	1,484	8.99
58	Regional Science And Urban Economics	12,990	1,672	7.77
59	Journal Of Accounting Economics	12,841	902	14.24
60	Economic Development And Cultural Change	12,737	2,127	5.99
61	Journal Of Regional Science	12,243	1,739	7.04
62	Imf Economic Review	12,032	1,284	9.37
63	National Tax Journal	12,003	2,615	4.59
64	Journal Of The European Economic Association	11,702	799	14.65
65	Economic Theory	11,544	1,888	6.11
66	World Bank Economic Review	11,307	771	14.67
67	Transportation Research Part A Policy And Practice	11,175	2,323	4.81
68	Health Economics	10,799	1,885	5.73
69	American Economic Journal Applied Economics	10,471	1,117	9.37
70	Journal Of Comparative Economics	10,102	1,336	7.56
71	Environmental Resource Economics	9,958	1,505	6.62
72	Journal Of Mathematical Economics	9,636	1,802	5.35
73	Insurance Mathematics Economics	9,623	2,177	4.42
74	Journal Of Development Studies	9,341	2,239	4.17
75	Journal Of Risk And Uncertainty	9,139	684	13.36
76	Cambridge Journal Of Economics	8,843	1,663	5.32
77	Small Business Economics	8,812	1,421	6.20
78	Economic Modelling	8,486	3,322	2.55
79	Journal Of Risk And Insurance	8,475	2,070	4.09
80	International Journal Of Forecasting	8,372	1,586	5.28
81	Applied Economics Letters	8,177	5,015	1.63
82	Kyklos	8,163	1,892	4.31
83	Journal Of Economic Issues	8,146	3,028	2.69
84	World Economy	8,069	2,065	3.91
85	Social Choice And Welfare	7,960	1,628	4.89
86	Journal Of Law Economics Organization	7,755	689	11.26
87	Journal Of Economic Growth	7,593	232	32.73
88	Journal Of Economic Psychology	7,106	1,588	4.47
89	Economics Of Education Review	6,668	1,340	4.98
90	Journal Of Policy Modeling	6,374	1,676	3.80

(*Continued*)

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Table 10. (*Continued*)

Rank	Journal	Citations	Articles	Citations per article
91	Journal Of Real Estate Finance And Economics	6,285	1,012	6.21
92	Journal Of Forecasting	6,237	1,236	5.05
93	Journal Of Economic Geography	6,235	532	11.72
94	Review Of Economic Dynamics	6,199	648	9.57
95	Journal Of Economics Management Strategy	6,192	752	8.23
96	Journal Of Population Economics	6,175	934	6.61
97	Explorations In Economic History	6,087	1,180	5.16
98	Food Policy	6,074	1,884	3.22
99	Economic History Review	6,069	1,840	3.30
100	Labour Economics	5,988	1,006	5.95

Florentin Glötzl holds a PhD in economics and has worked as a research and teaching associate at the Department for Socioeconomics of the Vienna University of Economics and Business. His research focuses on sectoral lending and borrowing flows in Europe before and after the crisis, the role of debt and deleveraging in European economic policy as well as on bibliometric analyses of economics as a discipline.

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