

Publication Arbitrage: Impact of Journal Rankings/ Scoring Systems on Publication Choices and Researchers' Careers

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czasopism na wybory publikacyjne oraz kariery
naukowców)

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Abstract

We study the impact of journal ranking systems on journal choice. We analyze data on over 0.5mln publications across over 1500 journals in economics, finance and business studies since 2000. We find evidence that authors in the UK and Norway strategically choose outlets maximising their publication scores given rankings used in their countries (ABS and NSD respectively). We identify the effects using plausibly exogenous variation in journal rankings across time and discontinuities in the ranking systems. Journals which experience an increase in a ranking score in a given country, experience also an increase in the shares of authors based in that country. We also find evidence that journals that receive relatively high scores in local rankings, given other bibliometric measures of journal quality, publish significantly more papers written by authors based in that country.

The importance of journal rankings is on the rise. National performance-based research funding systems (PRFS) widely use scoring systems based on journal rankings as a policy tool designed to provide efficient and fair allocation of research funds. Often, when such systems are absent or deemed insufficient, university associations or individual academic institutions step in to develop journal scoring systems for hiring and promotion decisions (e.g. ABS in UK or a top five indicator in the US top institutions in economics Heckman and Moktan (forthcoming)). In some disciplines, especially in business, prestigious newspaper rankings such as Financial Times (FT) Global MBA or Handelsblatt are widely perceived to be crucial.¹

Journal rankings briefly mentioned above are based on a combination of bibliometric measures and expert opinion with the latter component giving rise to a sig-

¹Although these rankings do not affect research funding directly, they are likely to have an impact on students enrolment decisions and thus student quality and tuition revenues.

nificant degree of heterogeneity. Furthermore, in a drive to promote transparency and simplicity, rankings are typically coarse.² They differ however in the number of tiers and threshold levels, some with as few as two categories (e.g. top five or the FT ranking). Finally, individual rankings are regularly updated. These features create differential incentives to publish in a given journal for authors affiliated with different institutions or at a different point in time. We exploit this variation to show both correlational and plausibly causal relation between rankings and individual publication decisions.

We study a bibliographical database *Econlit* covering over 0.5mln articles in more than 1500 journals in economics, finance and business in years 2000-2017 to identify the impact of rankings and changes in rankings on outlet choice. We find that academic arbitrage is widespread. Exploring changes in rankings, ABS in the UK in years 2008 to 2015 and NSD in Norway between 2004 and 2017, we find that scholars tend to buy cheap and sell dear and actively update their publication outlets in line with changes in journal rankings. Although the Norwegian ranking is linked directly to research financing³ while the UK ranking is purely indicative and designed as a guide for academics to the range and quality of journals⁴, the two rankings have a similar impact on individual publication decisions. Journals that have their ranking upgraded in a given country publish significantly more papers coauthored by scholars from that country after the ranking change. Downgraded journals become less popular among authors affected by the ranking, though the impact of ranking upgrading is stronger than that of downgrading. We also show that journals ranked relatively high by a given institution or country, conditional on other bibliometric journal scores such as impact factor or eigenvalue centrality measures (SCImago Journal Ranking), publish relatively more papers by authors from that institution and country.

While criticism of journal rankings is widespread,⁵ few studies provide quantitative evidence. Allocation of research funds in Australia based purely on publication counts led to a significant increase in journal publication productivity measured by the overall number of publications, but the research impact has declined (Butler, 2003). Excessive reliance on journal rankings is shown to reduce heterogeneity in

²Except for Poland with more than ten tiers.

³Approximately 2% of research funding in Norway is allocated according to performance measured by journal and monograph scoring systems.

⁴Anecdotal evidence suggests, however, that the ranking is used also by research institutions in hiring and promotion decisions.

⁵Citations based rankings are criticised for excess focus on scientific impact while missing other important research quality dimensions, such as solidity/plausibility, originality, and societal value (Aksnes et al., 2019). The criticism is even more fierce if rankings are used to assess individual researchers rather than collective research bodies. Furthermore, surveys among researchers reveal that journal ranking based scoring systems lead them to place greater weight on quantity than quality (Aagaard et al., 2015).

research (Lee, 2006), while a reduction in publication pressure brings more higher impact research and more exploratory research. (Azoulay et al., 2011). This study attempts to fill this knowledge gap.

This note is organized as follows. In the next section we present the data and methods used, section 2 discusses the main findings, while section 3 outlines the direction of future research.

1. Data and Methods

1.1. Data

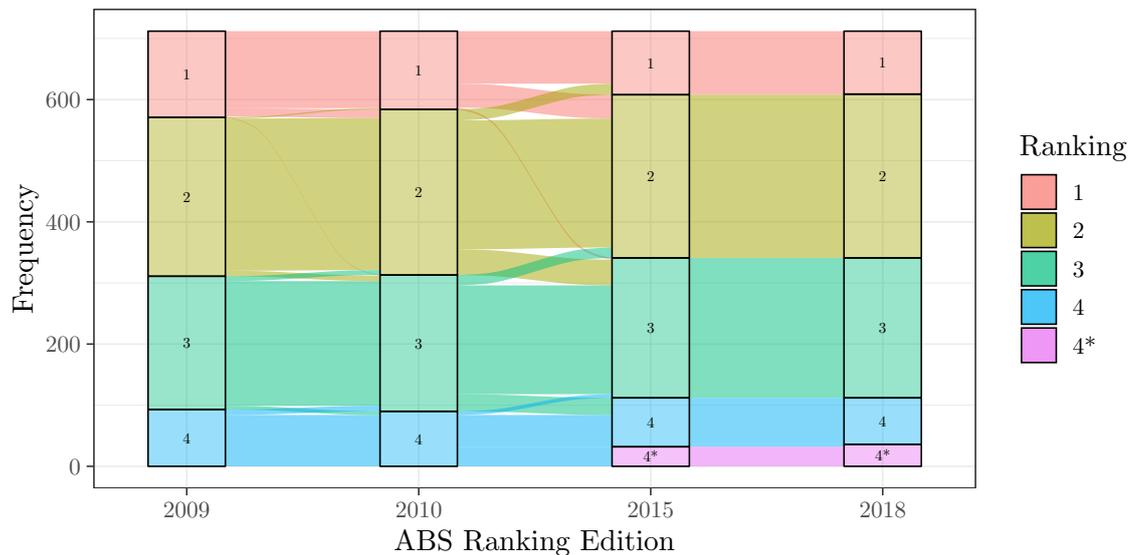
The primary source of bibliographical information is the *EconLit* database. Data downloaded in October 2018 contained 571,885 articles, which after removing articles with collective authors, editorial, book reviews, obituaries, etc. leaves us with 550,537 research articles across 1,588 journals for years 2000 - 2018. For each article, we have collected data on up to five authors and their affiliations. The database does not explicitly provide information on country of the reported affiliation, thus it has been inferred matching the *EconLit* data with various lists of research institutions.

For each article we create an indicator variable $Author_{UK}$ and $Author_{NO}$ that take value one if at least one of the authors of a given article is affiliated with at least one research institution based in the UK and Norway respectively. In total, 54023 articles have been single- or co-authored by a UK-based researcher, while 2666 articles have a Norwegian author. Given the relatively small number of Norwegian authors in the sample, we will focus on the UK based authors, while analysis of the impact of the Norwegian ranking will be moved to the appendix.

ABS Academic Journal Guide ranking (hereafter ABS ranking), designed by the UK based Chartered Association of Business Schools has been introduced in 2007 and updated in 2008, 2009, 2010, 2015 and 2018. The ranking throughout its history covered 1555 journals ranked. In the first two editions, ranking ranged between 1 and 4, while a new category, 4*, was added in 2015. The number of journals by category and ranking can be found in the appendix table A1. 466 of the ranked journals have been matched with the *EconLit* database. Each ranking edition included changes to the ranking, addition of new journals as well as upgrading or downgrading. While changes in 2009 and 2018 were rather cosmetic, the 2015 edition significantly changed the assessment of journal quality. 33 journals were included in the new highest category 4*, 42 were downgraded, 168 were upgraded and 590 new journals were added, mostly in the lower categories. The change is shown graphically in figure 1. The scale of the changes in 2015 makes it an ideal source of identification. Thus in the main analysis, we will focus only on papers published between 2010 and 2017 in 467 distinct journals included in the 2015 edition of the ranking and covered by the *Econ-*

Lit database. In total 157761 papers, out of which 21320 had at least one UK based co-author.

FIGURE 1
Change in ABS rankings.



Note: For visual clarity we show only journals included in all ranking editions.
Source: Authors

NSD ranking has been introduced in 2004 and is updated in annual frequency. The list covers all scientific disciplines and contains 33286 unique journals. Of that number 914 are matched with the *EconLit* database. The ranking is divided into just two categories, where category 2 includes up to 20% of the higher quality journals.

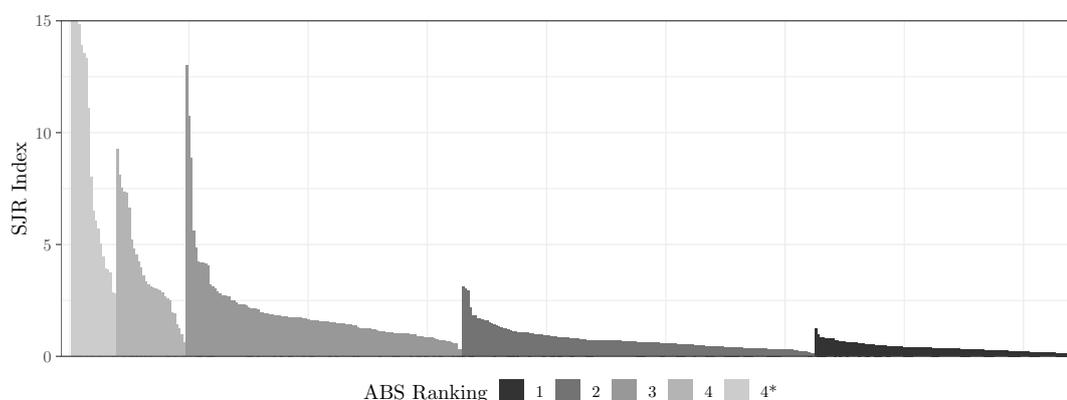
Finally, we use also SCImago Journal Rank (SJR) data to compare journals and rankings along an objective dimension (though not necessarily equivalent to journal quality). SCImago Journal Rank is an eigenvector centrality measure calculated for citations of each journal contained in the Scopus® database using an algorithm based on Google PageRank™.

1.2. Arbitrage Opportunities

The coarse nature of the rankings combined with the discretionary component in journal ranking naturally creates within-category differences between journals along with various objective measures of journal quality, which potentially create arbitrage opportunities.

Are those opportunities used by researchers? To answer this question we use data from figure 2 and split each ABS category into quartiles, according to the journal's

FIGURE 2
ABS and SJR Rankings: Arbitrage Opportunities



Note: Data for 2016. Each point bar is an individual journal included on both ABS and SJR ranking list. Y-axis (SJR Index) cropped at 15. The highest SJR index in the sample was 26.137 (Quarterly Journal of Economics).

Source: Authors

SJR index. For each group, we calculate the share of UK based authors. Journals with a high ABS but low SJR rankings are likely to be relatively more prestigious for the UK based researchers than for those affiliated in institutions in other regions. Thus, we would expect a relatively higher share of UK based authors in those journals. And that is exactly what we see in the data, especially among the ABS 3 and ABS 4 rankings, as shown in figure 3. While the share of UK based authors among the papers in the lowest SJR quartile among the ABS 4 journals is 23%, for the three remaining quartiles, this share is only 12%. For the ABS 3 rankings, we observe the share of 19% among the lowest quartile and 15% for the remaining journals in that category.

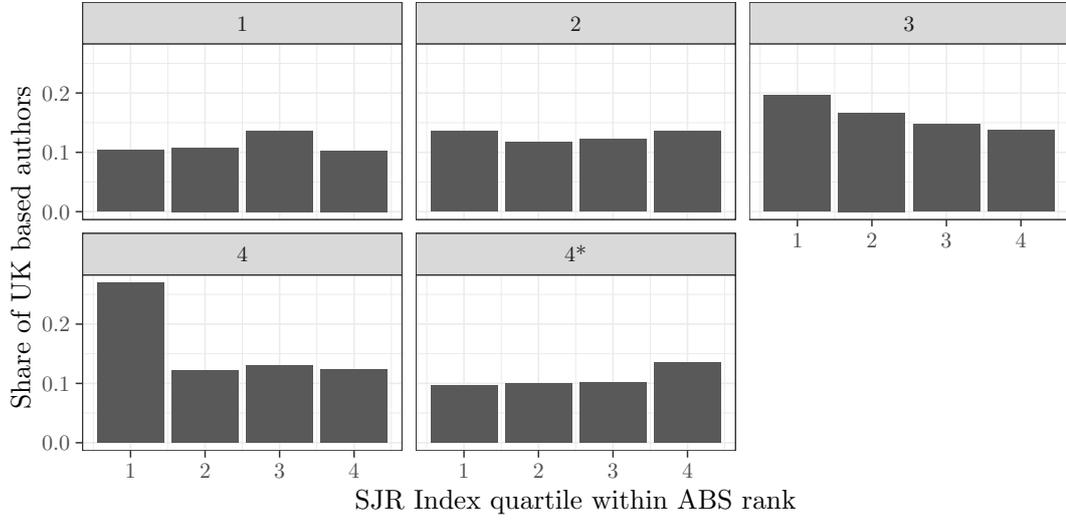
The evidence provided, although suggestive, does not allow us to talk about causality. One can think of a number of behind the results including regional differences in tastes, topical coverage and lobbying of journal editors. Thus in the following subsection, we discuss our identification strategy based on journal ranking changes.

1.3. Ranking Changes

We now move to study the impact of ranking changes on changes in publications decision. As indicated earlier, we focus on the impact of the 2015 change. We restrict our sample main to start in 2010, and end in 2017, the last year for which we have complete data. This way we also protect our results from the possible impact of the 2018 ABS ranking change. We will test the impact of ranking changes in a simple regression framework that can be summarised in the following equation:

FIGURE 3

Share of UK based authors by ABS rank journal influence (SJR) quartile



Note: Data for years 2010-2018. SJR Index quartile is defined as a quartile of SJR index distribution separately for different ABS scores. SJR Index changes in annual frequency thus SJR Index quartiles are calculated for each sample year.

Source: Authors

$$\text{Author}_{i,j,t}^{UK} = \text{Year} > 2015_t + \sum_{k \in \{\nearrow, \searrow, \text{New}\}} \beta^k \left(\text{Year} > 2015_t \times \text{Ranking Change}_{j,t}^k \right) + Y_{j,t} + \text{Journal}_j + \epsilon_i \quad (1)$$

Our main dependent variable is binary, and takes values one if at least one of the authors of an article i published in journal j in year t . $\text{Year} > 2015$ is an indicator variable that takes value one for 2016 and 2017 and zero otherwise. The ranking change was introduced in 2015, thus we implicitly assume, that the ranking change affects only publication decision for the papers published since 2016. $\text{Ranking Change}_{j,t}^k$ is a dummy variable that takes value one if journal j experienced a ranking change k : a ranking increase (\nearrow), decrease (\searrow) or was a new addition to the ranking. $Y_{j,t}$ is a set of additional covariates, which include ABS ranking in 2015, SJR index and JEL codes.

This specification allows is effectively a difference-in-differences setting, where controlling for journal fixed effects, we test if journals that had their ranking increased/ decreased had their share of UK based authors changed more than the control group of journals unaffected directly by the ranking change.

2. Results

Table 1 summarises the impact of the 2015 ABS ranking change on publication decisions of the UK based authors. In column (1) we see the simple difference-in-differences result. We see that on average, the share of UK based authors in journals that had their ABS ranking increased in 2015 increased by 0.8 pp, relatively to the control group, while the share of the British authors in downgraded journals decreased after the change by 0.3 pp. Those changes are, however, not statistically significant.

As the remaining columns reveal, the apparently moderate impact is due to treatment heterogeneity. The impact of the ranking increase on the share of UK based authors is higher for the highly ranked journals. As column (2) shows, the share of the UK based authors in journals that had their ranking increased to ABS 4 (from ABS 2 and ABS 3) increases by 3.3 p.p, while the share of the British authors in journals that received the new highest ranking 4* increases by 1.4 p.p.. These changes are statistically significant, however, they don't take into account the overall change in publishing patterns. Once we control for the change in ranking category choice that occurred after 2015 (column (3)), the impact of the change on the treated group diminishes to 2.4 p.p. for the new ABS 4 category and ceases to be statistically significant. The significance is restored, albeit only at the 10% level, once we introduce additional controls (JEL codes and journals' annual SJR ranking) (column (5)). At the same time, we observe no impact of ranking increase for lower ranked journals. The share of the UK based authors in the journals upgraded to category 3 changed in line with the change in the control group (category 3 journals), while for journal upgraded to category 2, the share of the UK based fell, though the decrease is not statistically significant.

Journals that experienced a ranking decrease, did not observe statistically significant changes in the share of the UK based authors, disregard of the journal category. However, the point estimates indicate that the decrease was the highest for journals downgraded from the highest category and around -1.1 to -1.2p.p. We also do not observe significant changes also for journals that were added to the ranking in 2015⁶ other than journals added to category ABS 1 journals.

Very similar results for Norway can be found in appendix table A2. In that country, ranking increased seem to have a stronger impact than ranking decreases and the impact seems to be stronger for higher ranking journals.

⁶Those results, however, are for brevity not displayed in table 1

TABLE 1
Impact of ABS Ranking Change on Share of UK Authors in Academic Journals

Dep. variable:	Share of UK Authors				
	(1)	(2)	(3)	(4)	(5)
Year > 2015	-0.000 (0.003)				
Year > 2015 × 2015 Increase	0.008 (0.006)				
2015 Decrease	-0.003 (0.011)				
2015 New	-0.001 (0.005)				
2015 ABS 1			-0.022** (0.010)		-0.024** (0.010)
2015 ABS 2			-0.007 (0.005)		-0.008* (0.005)
2015 ABS 3			0.006 (0.004)		0.005 (0.004)
2015 ABS 4			0.009 (0.008)		0.008 (0.008)
2015 Increase × 2015 ABS 2		-0.021 (0.014)	-0.015 (0.014)	-0.020 (0.014)	-0.012 (0.014)
2015 ABS 3		0.001 (0.008)	-0.004 (0.009)	0.000 (0.008)	-0.005 (0.009)
2015 ABS 4		0.033*** (0.013)	0.024 (0.015)	0.036*** (0.013)	0.028* (0.015)
2015 ABS 4*		0.014* (0.008)	0.014* (0.008)	0.010 (0.009)	0.010 (0.009)
2015 Decrease × 2015 ABS 1		-0.003 (0.020)	0.019 (0.023)	-0.012 (0.023)	0.012 (0.025)
2015 ABS 2		0.003 (0.020)	0.010 (0.021)	0.004 (0.020)	0.012 (0.021)
2015 ABS 3		-0.007 (0.017)	-0.012 (0.018)	-0.006 (0.017)	-0.011 (0.018)
SJR Index				0.003** (0.002)	0.003** (0.002)
Journal FEs	✓	✓	✓	✓	✓
JEL FEs				✓	✓
Num. obs.	157761	157761	157761	152766	152766
R ² (full model)	0.076	0.076	0.076	0.081	0.081

Note: All variables, except for SJR Index, are dummy variables. Variables 2015 Increase through 2015 New take value 1 if a given article was published in a journal that had its score increased, decreased, or was a new addition in the 2015 ABS ranking revision. Variables 2015 ABS 1 through 2015 ABS 4* are indicator dummies for journal ranking. Regressions (2) - (5) include also interaction between ABS journal ranking and variable 2015 New, but the results are not displayed. Source: Authors' calculations
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

3. Discussion

People like bargains, researchers are not an exception. The evidence so far suggests that individual publication decisions are affected by journal rankings. It is by no means surprising that ranking changes have the strongest impact on the higher ranked journals. It is a publication in those journals that determines hiring and tenure decisions.

Is the documented phenomenon a problem? Not if additional information is processed to assess the quality of the output of a given researcher in hiring and research funding decisions. However, the main goal of journal rankings is to minimize the need for such information. It remains, however, to be studied if this potential threat is a real problem. Are career prospects of an author choosing highly ranked, but less competitive journals equally good as that of an author who published in journals with the same rank, but higher international recognition?

Except for Heckman and Moktan (forthcoming), little is known about the impact of journal rankings on career progression. Within economics, publishing in one of the so-called top five journals significantly increase tenure probability. Researchers adjust their strategies to increase the probability of a top five publication rather than maximising the social value of the research they conduct.

Thus what we really want to test is the following:

1. Using rich biographical data voluntarily disclosed at ORCID.org that contains information on present and past positions, one could test if bargains affect career progression differently than “proper” highly ranked papers.
2. Are researchers wasting time and resources trying hard to publish above a threshold rather than moving on with new research ideas? Unique data set collected by ideas.repec.org provides data on the timing of working paper versions for both published and unpublished research articles as well as measures of popularity, such as the number of downloads and citations at various points in time. Exploring this dataset one could test how determined are authors to place their work in highly ranked journals and the relation between quality and time to publish.

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Appendix

TABLE A1
Distribution of ABS Journal Categories across Rankings

	ABS 2018	ABS 2015	ABS 2010	ABS 2009
1	599	483	183	142
2	532	474	286	261
3	312	310	229	219
4	83	87	93	93
4*	38	33		

TABLE A2

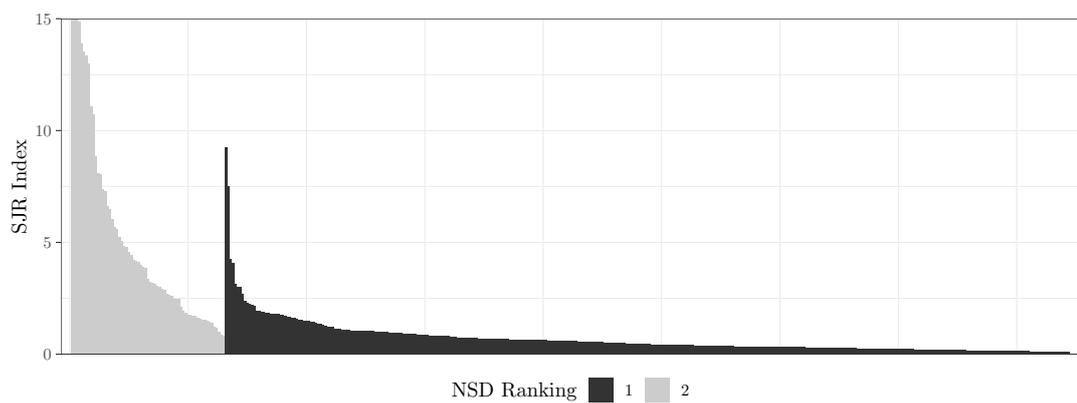
Impact of ABS Ranking Change on Share of Norwegian Authors in Academic Journals

Dep. variable:	Share of Norwegian Authors			
	(1)	(2)	(3)	(4)
NSD Rank Increased	0.0018*** (0.0007)		0.0028*** (0.0009)	
NSD Rank Decreased	-0.0012 (0.0018)		-0.0011 (0.0019)	
NSD Rank Increased \times Category 1		0.0015** (0.0007)		0.0023* (0.0012)
NSD Rank Increased \times Category 2		0.0029** (0.0013)		0.0033** (0.0014)
NSD Rank Decreased \times Category 0		-0.0017 (0.0072)		-0.0014 (0.0072)
NSD Rank Decreased \times Category 1		-0.0012 (0.0018)		-0.0011 (0.0019)
SJR			0.0003 (0.0002)	0.0003 (0.0002)
Journal FEs	✓	✓	✓	✓
JEL FEs			✓	✓
Year FEs			✓	✓
Num. obs.	343651	343651	289275	289275
R ² (full model)	0.0267	0.0267	0.0297	0.0297

Note: Sample: Econlit for years 2004-2018, only journals that had at most one ranking change throughout that period. All variables, except for SJR Index, are dummy variables. NSD Rank Increased/Decreased value 1 for years after ranking change for journals that had their ranking increased/decreased respectively. Variables Category 0, 1, 2 take value 1 if journal j was in a given category in year t . *Source:* Authors' calculations

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

FIGURE A1
NSD and SJR Rankings: Arbitrage Opportunities



Note: Data for 2016. Each point bar is an individual journal included on both NSD and SJR ranking list. Y-axis (SJR Index) cropped at 15. The highest SJR index in the sample was 26.137 (Quarterly Journal of Economics).

Source: Authors