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Publication performance vs. influence: On the questionable value of quality weighted publication rankings

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Publication Performance vs. Influence: On the Questionable Value of Quality Weighted Publication Rankings

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December 2017

Abstract

In broad parts of the scientific community the position in publication performance rankings, based on journal quality ratings is seen as highly reputational for the scientist. This contribution provides evidence that, at least in economics, such publication performance measures can not always be reconciled with measures for academic influence such as citation-based measures. We analyze data from the Scopus database as well as from the prestigious German-based Handelsblatt ranking for 100 renowned economists (lifetime achievement). Scholarly influence is proxied by various bibliometric indicators such as the number of citations, the h -index, the citations of the most cited paper as well as the hardly honorable Pi-Beta-score (“Publications Ignored, By Even The Author(s)”). We argue that publication performance measures based on journal ratings, such as the Handelsblatt rankings, are not good proxies for an economist’s impact within the scientific community. From this perspective the value of publication performance rankings based on journal quality ratings is questionable.

JEL Code: A12, A14

Keywords: economics, academic reputation, academic rankings, influence, citations, Scopus, Handelsblatt ranking, academic journals

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1 Introduction

The evaluation of university departments as well as scientists based on their publication record has become standard in many scientific fields (see, e.g., Graber *et al.* (2008); Schulze *et al.* (2008), Fitzenberger and Schulze (2014)), even though academics have also been critical about various rankings of journals, departments, and individual scientists (see, e.g., Oswald (2007); Frey and Rost (2010)). In Germany, the public evaluation of scientists based on publication records is a relatively recent phenomenon though, especially in social sciences. Traditionally, there has been relatively little systematic evaluation of researchers, and the rare occasions where evaluations have taken place have traditionally been based on opinions by valued colleagues. Relatedly, social scientists in the German speaking community (Austria, Germany, Switzerland) have only started in the past two decades to increasingly publish in English-language journals on a large scale instead of contributing to collected volumes or writing books (Krapf and Schläpfer (2012)).

In 2007 the Handelsblatt - the leading business daily in Germany - started to regularly rank individual economists as well as economics departments based on their publication performance. The rankings explicitly focus on the scientific contributions of both individual researchers and faculties. The original ranking approach was modified after some criticism (Hofmeister and Ursprung (2008)), but remained in its current form since 2010. In order to construct these rankings, journal articles are weighed firstly by the number of authors (by $1/n$, where n is the number of authors) and secondly by a quality weight p which depends on the publication outlet. Hence, every author obtains a score of p/n for every journal article to which (s)he has contributed.

The journal quality was based on a analyses in Combes and Linnemer (2010). The authors use bibliometric information from Thompson Scientific (Impact Factor) and Google Scholar to derive a continuous score for each journal. Then they summarized these scores into six groups with weights of 1.00, 0.67, 0.50, 0.33, 0.17 and 0.08. The Handelsblatt modified the weights and added some statistics journals. Over the years the journal ranking remained unchanged; only new journals were added. For the 2015 ranking, there have been 1,632 journals classified into seven quality groups or ratings (weight, number of journals): A+ (1.00; 10), A (0.6; 24), B+ (0.3; 46), B (0.15; 75), C+ (0.1; 110), C (0.1; 165), D (0.05; 1,202).¹ Books, contributions to books and articles in journals that are not listed are not counted, in general due to a lack of an external screening procedure of these publication outlets by independent and anonymous referees. The journal weighting has been criticized due to its lack of actuality and arbitrariness (see Butz and Wohlrabe (2016)) and the list of journals and their rating is now has been updated in September 2017.²

Based on these quality-weighted publication records Handelsblatt regularly publishes three different rankings for economics every two years³

1. The top 250 academic economists, based on their lifetime publication achievement,

¹The current journal list can found at www.forschungsmonitoring.org.

²Sturm and Ursprung (2017) show that using the new journal weights yield a similar economists ranking compared to the 2015 weights.

³There is also an ranking for business scholars which follows, by and large, the same methodology and which was last published in 2014. The rankings are, however, much more controversial among business scholars than the corresponding economist rankings are among economists (see, e.g., Berlemann and Haucap (2015)).

2. The top 100 academic economists, based on journal articles published within the last five years,
3. The top 100 academic economists under the age of 40.

Overall, the Handelsblatt-Ranking plays an important role at least in Germany (see, e.g., Schlöpfer and Schneider (2010); Münch, 2015). While there are, unlike the case of British research evaluation exercises, no direct funding implications based on the Handelsblatt rankings, the rankings are important for individual careers, as the rankings are regularly used to evaluate candidates in hiring decisions (Schlöpfer and Schneider (2010)). As in huge parts of the scientific community the Handelsblatt-Ranking became a signal for the reputation of a scientist, many economists list their personal Handelsblatt ranking as part of their CV. The rankings are financially supported by the German Economic Association and have been a regular topic for discussion at the annual meeting of the German Economic Association. The Handelsblatt ranking is intended to be a *research performance* ranking, i.e. it is silent about the actual *influence* or *impact* of an economist within or even outside the profession.⁴ The ranking's key idea is to measure the economist's research performance by the quality of the journals in which the economist under consideration publishes. The understanding is that the more articles an economist has published in high-quality journals, the higher is the economist's research performance. Hence, an economist's research performance is proxied by the "quality" of the journals in which he or she publishes, whereas the "quality" is connected to the average impact an article in the journal achieves (Oswald (2007)).

In contrast, it appears to be, by large, common sense within the scientific community that the influence or impact of a scientist can typically be measured by the number of citations he or she receives.⁵ Schlöpfer and Schneider (2010) demonstrated for the 2010 lifetime achievement ranking, that only 29 percent of an economist's Handelsblatt score can be explained by received citations. The authors used citation data from the Web of Science for the year 2009. This only reflected the *recent* not the *overall* influence of economists though. We expand the research by Schlöpfer and Schneider (2010) by contrasting the overall citation count of economists with the lifetime achievement reflected in the Handelsblatt-Ranking. We furthermore investigate the relationship to other bibliometric influence measures such as the *h*-index and the single most cited paper. We also take a look at the downside of reputation. For this purpose, we consider the so-called Pi-Beta ("Publications Ignored, By Even The Author(s)") score, introduced by Chang *et al.* (2011), which counts the number of published articles that have received not a single citation so far.

Taking all results into account we investigate the impact of publication performance rankings based on journal quality ratings on the relevance of scientific contributions.

The rest of the paper is now organized as follows: In section 2, we present the data used in our work, followed by section 3, where we investigate how publication performance rankings affect the relevance or impact of the contributions. Section 4 concludes.

⁴In contrast, in 2013 a new economist ranking was introduced in Germany published in the Frankfurter Allgemeine Zeitung. The ranking focuses on the impact of economists on research (measured as citations) as well as in the public and political sphere (see Haucap *et al.* (2014), Haucap *et al.* (2015) as well as Haucap and Thomas (2014)).

⁵However, the citation measures are also subject of criticism, see Posner (2000).

2 The data

We gathered our bibliometric scores from Scopus. Similar to Web of Science, Scopus is also a subscription-based database, which is multi-disciplinary and includes citations. It was launched in 2004 and is owned by the publishing house Elsevier. In addition to journals, Scopus covers books, book series, and conference proceedings (Wouters *et al.* (2015)). The database is updated daily and includes publications from more than 14,000 journals and references cited therein since 1969.⁶ According to the Expert Panel on Science Performance and Research Funding (2012), “Scopus and Web of Science have both been extensively used and tested in bibliometric analyses, and are sufficiently transparent in terms of their content and coverage to be generally useful in assessments of research performance at the field level” (p. 60).

We extracted for top 100 ranked economists in the 2015 Handelsblatt Ranking from the lifetime publication achievement ranking. We excluded four economists because we were not able to determine their age.⁷ For all authors we obtained the following metrics from Scopus

- number of publications (P)
- overall citations (C)
- h -index
- the top cited paper (Top-1-paper)
- Papers Ignored - By Even The Authors (Pi-Beta):

$$Pi - Beta = \frac{\text{Number journal articles with zero received citations}}{\text{Total number of published journal articles}}$$

A lower Pi-Beta would be preferred to higher.⁸

In Table 1 we provide corresponding descriptive statistics for the lifetime measures for the complete sample. The citation distribution across authors is skewed to the left. The mean is mainly driven by Ernst Fehr, who has an outstanding citation count of 22 127. The descriptive statistics show that we have a quite heterogeneous sample of economists.

Table 1: Descriptive Statistics

$N = 96$)	Age	Publication Performance		Influence			
		Publications	Handelsblatt score	Citations	h -index	Top-1-paper	Pi-Beta-score
Mean	53	62	10.9	1627	17	305	0.179
Median	52	53	9.6	949	16	139	0.171
Std	7	40	4.3	2660	8	501	0.088
Min	40	9	6.9	108	5	18	0.000
Max	74	246	29.7	22127	59	2792	0.475

⁶See Mongeon and Paul-Hus (2016) or <https://www.elsevier.com/solutions/scopus/content>

⁷These authors are Richard Baldwin, Christian Dustmann, Urban Jermann, and Gabriele Camera.

⁸Chang *et al.* (2011) argue in case of zero citations of a paper it reflects on the quality of a journal by exposing incorrect decision of the members of the editorial board of a journal; or opportunities of papers that might have been cited if they had not been rejected by the journal.

3 Publication performance vs. influence

Before we turn to the regression analysis we take a look at the correlations between the reputation and influence scores in Table 2. On the first look the correlations between the publication performance indications, number of publications and Handelsblatt score is with 0.618 relatively high. Hence, it is reasonable to test both in separate models in the following. With respect to scientific influence of all economists, both publication performance measures show the highest correlation with the h -index 0.654 (publications) and 0.482 (Handelsblatt score) respectively. The relatively high correlation with the h -index is hardly surprising, as number of publications is one of the two sub-measures of the h -index. However, the lower correlation of the Handelsblatt score with the h -index gives a first hint on the questionable impact of the quality-weights of the publication performance-based Handelsblatt ranking. A similar result shows up, between the publication performance measures and the second highest correlation (citations). Here, the correlation are 0.461 (publications) and 0.375 (Handelsblatt score). Again, the quality-weighted publication performance measure shows the lower correlation on the influence measured by citations. The correlations between the influence scores are rather high, especially between the citation count and the h -index (0.849) and the Top-1-paper (0.799) respectively. This points towards the potential need to estimate the models sequentially to obtain reliable results. The correlation between publications and the Pi-Beta-score is relatively high (0.421).

Table 2: Correlations between publication performance and influence scores

	Age	Publication Performance		Influence			
		Publications	HB score	Citations	h -index	Top-1-paper	Pi-Beta
Age	1.000						
Publications	0.396	1.000					
HB score	0.410	0.618	1.000				
Citations	0.140	0.461	0.375	1.000			
h -index	0.162	0.654	0.482	0.849	1.000		
Top-1-paper	0.102	0.241	0.186	0.799	0.486	1.000	
Pi-Beta-score	0.274	0.421	0.124	-0.118	-0.073	-0.107	1

To address the question about the relationship between publication performance and influence we estimate all influence indicators separately by successively introducing the independent variables Handelsblatt score, age and publications in the estimation equation. In Table 4 we report the results. As shown in specification (2), (3), (6) and (7) the number of publications has a significant influence on the number of citations. Only in the specifications without publications (4) and (5) the Handelsblatt score seems to have some explanatory power on a lower significance level. This can be caused by the fact that the Handelsblatt score is beside the journal quality-weights calculated by the number of publications. However, in all specifications concerning the number of publications the influence of the Handelsblatt score disappears. Across all specifications the highest explanatory power is provided by specification (7) with an R^2 of 0.233.

A similar interpretation applies when focusing on the h -index as dependent variable. Over all specifications the predictive power of quality-weighted publication performance is limited. Again, only in the specifications without number of publications we see some significant results for the Handelsblatt score. In all specifications including the number of publications the

influence disappears. In comparison to the explanation of the citation the significance level is now higher. This is hardly surprising, as the h -index is beside the number of citations calculated by the number of publications. The highest explanatory power is again provided by specification (7) with an R^2 of 0.455. Interestingly, in this specification beside the number of publications, now the age has a significant and negative influence on the h -index: this can be seen as an indicator for the existence of quality-ensuring competition and/or institutions among the younger scholars. This also indicates that there is no Matthew effect present, i.e. older and well-known economists gather citations just because they are well-known (Birkmaier and Wohlrabe (2014)).

Focusing on the Pi-Beta-score in specifications (2), (3), (6) and (7) the number of publications has a small but significant influence, i.e. the higher the number of publications, the higher the share of absolute irrelevant papers. Here, the influence of the Handelsblatt score remains significant and negative after controlling for age and the number of publications - a first hint on a useful impact of the Handelsblatt score, as it reduces the share of absolute irrelevant paper. In addition, now age has a small but significant positive influence in the specifications (1), (5) and (7): the higher the age, the higher the share of irrelevant papers. This is an additional empirical fact contradicting the existence of a Matthew effect. The highest explanatory power is again provided by specification (7) with an R^2 of 0.233.

None of our explanatory variables is able to explain the citations of the Top-1-paper.

4 Conclusion

In broad parts of the scientific community the position in publication performance rankings, based on journal quality ratings are seen as highly reputational for the scientist. This contribution provides evidence that, at least in economics, such publication performance measures can hardly be reconciled with measures for academic influence such as citation-based measures. We analyze data from the Scopus database as well as from the prestigious German-based Handelsblatt ranking for 100 renowned economists (lifetime achievement). Scholarly influence is proxied by various bibliometric indicators such as the number of citations, the h -index, the citations of the most cited paper as well as the hardly honorable Pi-Beta-score (“Publications Ignored, By Even The Author(s)”). To address the question about the relationship between publication performance vs. scientific influence we estimate all influence indicators separately by successively introducing the independent variables age, publications and Handelsblatt score in the estimation equation.

With respect to the lifetime achievement the specifications with the highest explanatory power only show a significant influence of the number of publications on the influence measured by number of citations. Neither age nor the Handelsblatt score has a significant influence. Additionally, we find some evidence that age as well as the number of publications have a significant positive impact on the Pi-Beta score. The bigger the number of publications and the higher the age, the bigger the share of absolute irrelevant papers. This hints on the existence of more quality ensuring competition and / or institutions among the younger. In addition, here, the influence of the Handelsblatt score is significant and negative. The only hint we could find on a potential useful impact of the Handelsblatt score, as it reduces the share of absolute irrelevant papers.

As a result, publication performance measures based on journal ratings, such as the Han-

delsblatt rankings, are not at all good proxies for an economist's impact within the scientific community. The fact that the influence of the Handelsblatt score disappears in all specifications with the number of publications, sheds some light on the highly questionable value of the quality weights used to calculate the Handelsblatt score.

Table 3: Relationship between publication performance and influence: Lifetime achievement

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable: Citations							
Age	51.50		-19.64		-6.81		-31.84
Publications		30.56 **	31.93 **			24.51 **	25.82 **
Handelsblatt score				233.39 *	237.99 *	91.46	105.34
R^2	0.019	0.214	0.216	0.142	0.176	0.227	0.233
Dependent Variable: h -index							
Age	0.17		-0.12		-0.05		-0.16 *
Publications		0.12 ***	0.13 ***			0.11 ***	0.11 ***
Handelsblatt score				0.85 ***	0.88 ***	0.22	0.29
R^2	0.026	0.428	0.439	0.233	0.235	0.438	0.455
Dependent Variable: Top-1-paper							
Publications		3.01	2.99			7.38	2.54
Handelsblatt score				22.00	20.66	2.53	7.59
R^2	0.010	0.058	0.059	0.036	0.036	0.061	0.061
Dependent Variable: Pi-Beta-score							
Age	0.00 **		0.00		0.03 **		0.00 *
Publications		0.00 ***	0.00 ***			0.00 ***	0.00 ***
Handelsblatt score				0.03	0.00	0.00 **	-0.05 **
R^2	0.075	0.177	0.191	0.015	0.075	0.207	0.233

This table reports regression coefficients. In each panel we report the results for a different influence score (citations, h -index, Top-1-paper, Pi-Beta-score). A constant is always included but not reported. $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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