Top Researchers as Stewards of Scientific Integrity: Evidence from a Randomized Natural Experiment

Natalia Zinovyeva*

December 31, 2016

Preliminary version

Abstract

In recent years academia has observed the mushrooming of journals pretending to be academic though in reality providing no peer review. If some authors are accountable to principals who cannot accurately observe research quality, they may have incentives to publish in dubious journals. Exploiting exogenous variation in the composition of promotion committees in Italy, I analyze how the research quality of evaluators affects the success of authors with dubious publications. I use the blacklist of 'potential, possible, or probable predatory journals' by Jeffrey Beall to identify questionable articles. I find that the returns to dubious publications are significantly lower when researchers are evaluated by committees of higher research quality. Results indicate that the presence of top researchers in scientific committees helps to improve incentives in academia and to discourage academic misconduct.

JEL Classification: I23, J45

*Department of Economics, Aalto University, Helsinki, Finland; email: natalia.zinovyeva@aalto.fi

1 Introduction

In recent years academia has observed the mushrooming of journals that provide no peer review, but pretend to be academic. Some revealing information above the scale of the phenomenon can be obtained from the famous black list of 'potential, possible, or probable predatory journals' created and maintained by the scholarly librarian Jeffrey Beall (University of Colorado, Denver). In most cases, the journals included into the list have no serious academic peer-review process even if they explicitly claim the opposite. Sometimes they fake their editorial boards and impact factors. They have titles that create a wrong impression about their association to academic institutions or about their geographic location. In 2012, the black list of Mr. Beall included 143 standalone journals and about 269 publishers. In the end of 2014, it included 468 standalone journals and 667 publishers. By the end of 2016 Beall's list includes 1260 standalone journals and 1155 publishers.[1]

On the one hand, the proliferation of dubious journals has definitely become easier with the emergence of online journals that made it easier and cheaper to run a journal. On the other hand, the survival of these journals would not be possible had there been no authors willing to publish there. It is possible that some authors have incentives to publish in dubious journals if they are accountable to principals who cannot accurately observe the quality of their publications. If this is the case, the existence of authors publishing in predatory journals is a very worrying signal of malfunctioning system of academic evaluations.

In this paper I test whether top researchers are less likely to give credit to publications in 'predatory' journals. In order to identify the causal effect of evaluators' research quality on the success rate of authors with publications in predatory journals, I exploit the fact that in the Italian national qualifications evaluators are randomly assigned to scientific committees out of the pool of eligible evaluators in the corresponding field. I analyze whether committees, which due to the outcome of the random draw are composed of evaluators with better research record, are less likely to give credit to publications in Beall's list. I measure evaluators' quality by the number of their publications in high-impact journals.

I find that about 5% of Italian researchers have published in Beall's list journals. Engineering, economics and business are among the disciplines with the highest proportion of authors with predatory publications: about 10% of CVs in these disciplines include publications from Beall's list. Within disciplines, authors with predatory publications are more likely to be individuals with a relatively higher publication count,

[1] As a validation experiment, Science magazine submit a fake medical paper with easily detectable flaws to 304 open access journals, with about a hundred journals being from Beall's list (Bohannon 2013). On average, more than half of journals accepted the paper with no requested revisions. The acceptance rate in Beall's list journals was 82%.

but at the same time with fewer high-impact publications. Researchers with longer experience are significantly less likely to engage in predatory publishing. Instances of researchers publishing in predatory journals are more frequent at the departments with relatively low research quality and in the universities in the South of Italy.

I find that evaluators with more publications in high-impact journals are significantly less likely to promote authors with dubious publications. The magnitude of the effect is substantial: a one standard deviation increase in evaluators' research quality decreases the returns to dubious publications by about 7 percentage points, or by about 20% as compared to the average success rate of 37% (Fig. 1). The effect is mainly driven by economics and business, social sciences and humanities, where the magnitude of the effect is about three times larger. The estimates imply that some committees with relatively poor research quality may actually give credit to predatory publications.

This empirical finding suggests that better researchers among evaluators help to reduce the returns to predatory publications. Their better evaluations may in turn improve the incentive structure in academia and, perhaps, discourage academic misconduct.

2 Open-Access publishing and predatory journals

The business of fake or dishonest academic journals became easier with the recent emergence of the open-access (OA) model of publishing. In the last ten years the open-access model has gained substantial popularity with the annual growth of OA journals being 18% (Laakso et al. 2011). While in the traditional publishing model the access to academic publications is restricted by subscription fees, OA journals offer immediate open online access to the articles published in these journals. A stronger perception that the results of publicly funded research should be openly accessible was one of the factors affecting the rise of OA journals. Improved circulation of knowledge and associated benefits for innovation and scientific discovery are also the factors that shift public opinion toward a rather positive view of OA journals. Yet, the OA model has one substantial limitation relatively to the traditional one. OA model shifts the burden of payment from readers to authors. If traditional journals mainly depend on the willingness of academic libraries to subscribe to a journal, OA journals depend on authors' willingness to pay publication fees. Naturally, the motives to read academic research and the motives to publish academic research may be different. University libraries do not have incentives to subscribe to a journal that publishes articles of low or no scientific value. However, authors may be willing to publish such articles if they expect returns to these publications to be positive. Some OA journals may decide to serve this niche of demand. As well, if some authors have poor ability to assess

the integrity of journals, some non-academic OA journals may deliberately misguide authors by imitating journal academic nature. As a consequence, academic work in these journals would be more likely to be published without passing through a rigorous peer review.

Professor Beall catalogues journals and publishers, predominantly operating within OA publishing model, which according to his judgement engage (or are likely to engage) in fraudulent practices.[2] These journals, which Mr. Beall names 'predatory', in most cases have no serious academic peer-review processes even if they explicitly claim the opposite. Sometimes they even fake their editorial boards and impact factors. They have titles which create a wrong impression about their association to academic institutions or about their geographic location.[3] They massively spam academic community offering unrealistically fast review and publication process, while not mentioning substantial publication fees. At the beginning of 2015, the black list of Mr. Beall included 468 standalone journals and 667 publishers. The publishers included in Beall's list are extremely prolific: altogether they run over 12,000 journals.[4] Over time, the number of predatory journals and the publication volume of these journals are increasing (Shen and Björk 2015).

Beall's list seems to be relatively good in detecting spoof journals. In 2013, *Science* ran an experiment, in which a fake medical paper with easily detectable flaws was submitted to over 300 journals claiming to have referee processes, 137 of them being from Beall's list (Bohannon 2013). 82% of journals from Beall's list accepted the paper. Even if publications in journals from Beall's list are not a definite indication of fraud, one would expect that the absence of effective peer review processes in these journals coupled with their fraudulent intentions of the publisher increases the likelihood of publications with mistakes, plagiarism and other problems.

Recent evidence suggests that the authors publishing in Beall's list journals are predominantly young and inexperienced researchers from developing countries (Xia et al., 2015). There is no good estimate available in the literature of a proportion of academic researchers in developed countries that publish in predatory journals.

[2]The list can be accessed at https://scholarlyoa.com. The full set of criteria used to include journals and publishers in the list can be found here: https://scholarlyoa.files.wordpress.com/2015/01/criteria-2015.pdf.

[3]For instance, the American Journal of Advances in Medical Science, apparently an American journal, is actually based in India. The European Journal of Scientific Research is based in Seychelles.

[4]This estimate comes from the information on journal titles that I collected from the webpages of the publishers included in Beall's list at the beginning of 2015.

3 Academic promotion in Italy

Since 2010 all promotions in Italian universities are decided within a two-stage evaluation system.[5] In the first stage, candidates to associate professor and full professor positions are required to qualify in a national-level evaluation known as the National Scientific Qualification (*Abilitazione Scientifica Nazionale*). Evaluations are conducted separately in 184 scientific fields as defined by the Ministry of Education. Qualified candidates can participate in the second stage, which is managed locally by each university.

3.1 The National Scientific Qualification

The first evaluations of the National Scientific Qualification were performed between 2012 and 2014.[6] In the summer of 2012 the calls for eligible evaluators and for candidates' applications were advertized by the Ministry. For candidates, the submission package included the CV and up to 20 selected publications. Researchers were able to apply to multiple fields and positions.

Once the list of eligible evaluators was settled and the application deadline for candidates was closed, committee members were selected by random draw. These lotteries were held between late November 2012 and February 2013. Following their appointment, each evaluation committee had to draft and to publish online a document describing the general criteria that would be used to grant positive evaluations. At this point, pre-registered candidates could still withdraw their application. The deadline to withdraw the application expired two weeks after the committee composition had been decided and the committee had publicly announced the evaluation criteria. By the end of this period, evaluation committees were informed about the final list of candidates and the evaluation took place.

3.2 Selection of committees

The pool of eligible evaluators includes full professors in the corresponding field who have volunteered for the task and satisfy some minimum quality requirements. In sciences, technical and engineering fields, mathematics and medicine (STEM&M) the requirement is to be above the median of full professors in the field in at least two of the following three dimensions: (i) the number of articles published in scientific journals covered by ISI Web of Science, (ii) the number of citations, (iii) and the H-index. In the

[5] Law number 240/2010, also known as "Gelmini reform" after the name of the minister of Education.

[6] Official documents regulating the process are available at `http://abilitazione.miur.it/public/index.php?lang=eng`, retrieved on February 2016. A detailed description of the system can be also found in Bagues, Sylos-Labini, Zinovyeva 2016.

social sciences and the humanities, eligible evaluators are required to have a research production above the median in at least one of the following three dimensions: (i) the number of articles published in high quality scientific journals (in what follows, A-journals),[7] (ii) the overall number of articles published in any scientific journals and book chapters, and (iii) the number of published books.

Eligible evaluators may be based in Italy and may also be affiliated to a university from an OECD country. International and Italian eligible evaluators have to satisfy the same research requirements but their remuneration differs. While 'Italian' evaluators work *pro bono*, OECD evaluators receive €16,000 for their participation. Evaluation committees include five members. Four members are randomly drawn from the pool of eligible Italian evaluators, under the constraint that no university can have more than one evaluator within the committee. The fifth member is selected from the pool of eligible international evaluators.

Randomization is conducted in a way that leaves little room for manipulation. Eligible evaluators in each field are ordered alphabetically and are assigned a number according to their position. A sequence of numbers is then randomly selected. The same sequence is applied to select committee members in a number of different fields.

Evaluators are in charge for two rounds of the national scientific qualification. If an evaluator resigns, a substitute evaluator is selected randomly from the corresponding group of eligible evaluators.

3.3 The evaluation

The evaluations are based only on candidates' CVs and publications. Committee members meet several times to discuss their assessments and cast their votes. A positive assessment requires a qualified majority of four positive votes (out of five committee members).

Committees have full autonomy on the exact criteria to be used in the evaluation. Nonetheless, it is important to point out that an independent evaluation agency (ANVUR), appointed by the Ministry, collected and publicized information on the research productivity of all candidates in the previous ten years. This productivity was first measured by the same three bibliometric indicators that were employed to select evaluators and it was then adjusted to take into account the amount of time passed since first publication and also the number of job interruptions (this last typically related to parental leave). The evaluation agency also used these bibliometric dimensions to provide the average research productivity of professors in those categories to which candidates might apply. Committees are not obliged, though encouraged, to use this information.

[7] An evaluation agency and several scientific committees determined the set of high-quality journals in each field.

At the end of the process, committees provide each candidate with (i) the final outcome of the evaluation (pass or failure), (ii) a collective report explaining the criteria used by the committee and how they reached their final decision and (iii) five individual reports explaining each evaluators' position.

4 Data

I consider all evaluations held within the first round of the *National Scientific Qualification*. The database includes examinations for associate and full professorships in 184 academic fields.[8]

4.1 Applications

More than 46,000 researchers pre-registered in the first round of the national scientific qualification. This accounts for around 61% of assistant professors and 60% of associate professors in Italy.[9] One third of candidates registered in several fields or in different categories of the same field. In total there were 69,020 pre-registered applications, approximately 375 per field.

Table 1 provides information on the characteristics of the applications. 38% of applications are submitted by female researchers. On average, applicants have 15 years of experience measured as time elapsed since their first publication. Most of candidates are already based in an Italian university, typically with a permanent position in the field in which they seek promotion. About a third of candidates are either not affiliated to an Italian university or have a short-term labor contract. To measure the research quality of Italian university departments, I use a score obtained by each department in a periodic national assessment of research quality coordinated by ANVUR.[10] The assessment is carried out by independent experts who review a selected number of research products from each department. The resulting score varies between zero (low quality) and one (high quality). I use the assessment from 2011 based on publications between 2004 and 2010. An average candidate comes from a department with score 0.6 (standard deviation is 0.2).

Table 1 also provides information on the research publications included in candidates' CVs published no later than ten years before the evaluation. An average applicant has published 46 items in the previous 10 years. About 58% of these publications are journal articles, 16% are conference proceedings, 16% are books and chapters of

[8]CVs of initially pre-registered candidates and all eligible evaluators was collected from the webpage of the Ministry of Education.

[9]Source: Our own calculations using information from the Italian Ministry of Education on the identity of all assistant (*Ricercatori*) and associate professors (*Associati*) in Italy on December 31 2012.

[10]Details about these evaluations can be found here: http://www.anvur.org/rapporto/.

books, 11% are other types of publications. Disciplines are very heterogenous in the type of publications they produce. In sciences and medical disciplines, journal articles are the main type of academic communication. In engineering, conference proceedings are at least as popular as journal articles. In economics and business and in social sciences and humanities, many academics write books or chapters of books. Journal articles are mostly published in international journals in all fields apart from social science and humanities. In the latter case, academics publish predominantly in local language and in journals that are typically not included in such repositories as Thomson Web of Knowledge (ISI) or Scopus.

I consider two indicators of quality of journal articles. In STEM&M fields, I consider how many publications the author has in top quartile (Q1) journals in the Web of Knowledge in the corresponding field as ranked by journals' Article Influence Score.[11] In economics and business as well as in social sciences and humanities, I use the list of high-impact journals (so-called 'A-journals') that was prepared by the Italian evaluation agency. This list includes approximately 7,000 academic journals. 30 to 50% of articles of candidates in STEM&M fields are in top 25% of journals in the Web of Knowledge. In economics and business, about 14% of articles are in top 25% of journals in the ISI Web of Knowledge; this figure is a bit higher (19%) for A-journal publications. About 30% of articles in the fields in social sciences and humanities are in A-journals.

4.2 Publications in Beall's list journals

I match journal articles in candidates' CVs with the list of dubious journals maintained by Jeffrey Beall. Generally, this task is not very trivial, neither for an econometrician, nor for evaluators who evaluated candidates' CVs had they wanted to do so. Candidates' CVs do not include the name of the publishing house, while Mr. Beall does not collect journal titles for the predatory publishers in his list. To find out whether a given article is published in a Beall's list journal, one needs first to find the publisher of the journal and then check if this publisher is included into Beall's list. This procedure may be time consuming and prone to errors, since there are too many CVs and publications to be screened, while the titles of predatory journals are often copied from the ones of legitimate journals. I took a different approach. Following the links to publishers' websites in Beall's list, I collected the titles and the ISSN codes of journals published by these publishers. I also collected the ISSN codes of journals included into Beall's list of standalone predatory journals. I then matched Beall's list journals and candidates' CVs using the ISSN code of the journal. To avoid erroneous assignment of

[11] Article Influence Score is an indicator similar to a 5-year Impact Factor of the journal, but it has several advantages. It weights citations by the quality of the citing journal and by the inverse of the number of references in citing journal; it also excludes self-citations.

publications in legitimate journals to predatory journals with the same title, I ignored predatory journals with no ISSN codes (about 40% of all Beall's list journals).[12] Note that candidates were required to report the ISSN code of their journal publications, and less than 5% of candidates' journal publications in their CVs miss the ISSN code.

I find that 3 447 CVs (5%) included at least one publication from Beall's list (Table 1). 972 CVs (1.4%) included more than one predatory publication. Propensity to publish in predatory journals differs substantially across fields. In sciences and in medical sciences, about 5-7% of authors have predatory publications. About 10% of researchers in engineering and economics & business have articles in predatory journals. In social sciences and humanities, less than one percent of authors published in journals from Beall's list. Since disciplines differ in their propensity to publish in English-language journals, monitored by Mr. Beall, it is perhaps more informative to compare disciplines in terms of the proportion of English-language articles in these disciplines that are published in Beall's list journals. The lowest proportion of English-language articles published in Beall's list journals is observed in STEM&M fields, followed by social sciences and humanities and engineering, with economics and business being the field with the highest propensity to publish in predatory journals. More than 3% of English-language articles in economics and business are in Beall's list journals.

4.3 Evaluators

Altogether 5,876 professors from Italian universities volunteered and qualified to be in the pool of eligible evaluators. In the pool of eligible evaluators based abroad there were 1,365 professors. In the average field, the pool of eligible evaluators includes 32 Italian professors and eight international professors.

Table 2 provides descriptive information on eligible evaluators based in Italy. Eligible evaluators have on average almost twice longer experience in research than candidates that they evaluate. They are twice fewer women among evaluators than among the candidates. The average CV includes 74 research outputs published in the previous 10 years, mostly journal articles (37), books and chapters (18), and conference proceedings (13). Eligible evaluators have also published more articles in high-impact journals than the candidates. This advantage of evaluators over candidates is observed across all disciplines, though it is the smallest in economics and business.

Similarly to the case of candidates, about 5% of eligible evaluators have at least one

[12] I exclude from 2014 Beall's list the journals run by MDPI, the publisher that in 2015 was excluded from Beall's list after a successful appeal. All results presented below are robust to more restrictive definitions of predatory journals: (i) Beall's list journals excluding those that are listed in Scopus and appear to be in the first quartile in the corresponding discipline according to Scopus Journal Rank (5 journals, about 11% of applicants' publications in Beall's list)); (ii) Beall's list journals excluding those that are either listed in the Web of Knowledge, or Scopus, or appear in the list of high-impact journals of ANVUR (about 130 journals, 40% of applicants' publications in Beall's list).

publication in a journal from Beall's list, 1.5% have more than one. 45 of 736 finally selected evaluators have published in predatory journals.

Approximately 8% of Italian evaluators drawn in the initial lottery resigned and were replaced by other (randomly selected) eligible evaluators. The resignation rate was slightly higher among international evaluators (10%).

5 Empirical analysis

I start by describing candidates' characteristics that are associated with a higher likelihood of publishing in Beall's list journals. I then assess the average returns to predatory articles in Italian Scientific Qualifications. Finally, I analyze whether the better expertise of committee members as measured by their research quality helps to reduce returns to predatory publications.

5.1 Who does publish in Beall's list?

In order to describe the profile of a typical candidate who publishes in Beall's list journals, I estimate the following equation:

$$P_{i,e} = \beta_0 + \mathbf{X_{i,e}}\beta_\mathbf{1} + \mu_e + \epsilon_{i,e}, \tag{1}$$

where $P_{i,e}$ is an indicator for candidates who have published in Beall's list journals, $\mathbf{X_{i,e}}$ is a set of individual characteristics and μ_e are discipline times promotion category fixed effects.

Authors with predatory publications are more likely to be individuals with a relatively higher publication count, but at the same time with fewer high impact publications (Table 3). They are more likely to be found among less experienced researchers. Women are less likely to have publications in Beall's list than men, but this difference is not statistically significant.

Predatory publications are more common among candidates who are based in Italian universities than among candidates based in foreign universities or candidates with non-academic jobs. Publishing in Beall's list journals is particularly common in departments with relatively poorer research quality and departments located in the South of Italy.

5.2 Returns to predatory articles

On average, authors with predatory publications have a similar success rate as the rest of the candidates. The only disciplinary area in which the gap in the success rate between the two groups of candidates is significant is sciences. Here only 36%

of authors with predatory publications get promoted, whereas 42% of the rest of the candidates do.

As it was described earlier, authors with Beall's list publications differ from the rest of candidates in several ways. They publish fewer top-journal articles and they publish more other journal and non-journal articles. In order to estimate the returns to predatory articles, I compare authors who have a similar number of non-predatory publications, but who differ in whether they have published in Beall's list journals or not. I estimate the following equation on the sample of all initially pre-registered candidates:

$$Success_{i,e} = \beta_0 + \beta_1 P_{i,e} + \mathbf{X_{i,e}}\beta_\mathbf{2} + \mu_e + \epsilon_{i,e}. \quad (2)$$

where $Success_{i,e}$ is an indicator variable that takes value one if the candidate received a qualification and takes value zero if the candidate failed or withdrew the application. $\mathbf{X_{i,e}}$ includes various indicators of candidates' research productivity, as well as other individual characteristics that might be correlated with candidate quality, such as experience, the type of position, the research quality of university department, etc.

I observe that individual indicators of candidates' quality are all strongly correlated with success (column 1, Table 4). The number of high-impact publications is the strongest predictor of success: one standard deviation more high-impact publications increases the candidate's chances of success by 12.5 percentage points (or 34%). A similar increase in other ISI or Scopus publications is associated only with a 2.9 percentage points (p.p.) increase in the success rate. Returns to chapters in collective volumes are on average slightly higher (3.8 p.p.), while returns to conference proceedings and books are slightly lower. Conditional on these publications, the rest of publications, if anything, act as a negative signal of candidates' quality and are negatively correlated with success. Candidates with publications in predatory journals are also relatively less likely to obtain a positive evaluation from a national evaluation committee: their success is 2.5 p.p. lower than the success of other candidates with similar observable non-predatory publications, similar experience, position and affiliation (column 2).

In columns 3-7, I perform a similar analysis separately for different disciplinary groups. High-impact publications are the strongest predictor of success across all disciplinary groups, including the ones where the dominant form of science communication is not academic journals, but rather conference proceedings (like in engineering) or books and chapters of the books (like in social sciences and humanities). In none of the disciplinary groups having predatory publications on top of other publications is on average associated with a higher success rate.

5.3 The effect of committee quality on the success of predatory authors

In order to assess whether committees of better research quality are less likely to promote candidates with predatory publications, I exploit the fact that evaluators in the Italian system are randomly selected from the pool of eligible professors in a corresponding discipline. This feature provides a setting of a large-scale natural randomized experiment: the average research quality of committee members, conditional on the composition of the corresponding pools of eligible evaluators, is uncorrelated with candidates' characteristics and it can be only attributed to the randomness of the draw. I compare the success rate of candidates who, given the composition of the corresponding pool, expected to be evaluated by similar committees but who due to the randomness of the draw were eventually assessed by committees of different research quality.

I proxy evaluators' research quality by the number of their high-impact publications, namely, publications in top quartile journals in ISI Web of Knowledge in STEM&M fields and the number of publications in A-journals in other fields. Empirical results from the previous section suggest that this indicator is the best predictor of research quality in all disciplinary groups. I normalize these indicator among eligible evaluators in the same discipline. I then estimate the following equation:

$$Success_{i,e} = \beta_0 + \beta_1 P_{i,e} + \beta_2 P_{i,e} * R_e + \beta_3 P_{i,e} * E(R_e) + \mathbf{X_{i,e}}\beta_\mathbf{4} + \mu_e + \epsilon_{i,e}, \quad (3)$$

where R_e is the average research quality of the committee and $E(R_e)$ is the expected research quality of the committee. Expected research quality is computed as an average of one million simulated draws from the pool of eligible evaluators taking into account constraints that were officially imposed on the randomization. β_2 provides a causal estimate of the effect of committee research profile on the relative success of predatory authors.

Results are reported in Table 5. I find that higher research quality of committee members significantly decreases the likelihood that an author with publications in Beall's list obtains a qualification. On average, in each discipline and rank there are about 188 candidates aspiring promotion and about 37% of them obtain positive assessments. In the average committee, a candidate with predatory articles has about 2.2 percentage points lower success rate, relatively to other candidates with similar observed characteristics. A one standard deviation increase in the quality of all committee members further reduces their success by 6.7 percentage points (column 1).

In column 2, I explicitly take into account the fact that about 8% of evaluators resigned after being assigned to committees by the random draw. I use the research quality of initially drawn committee members as an instrumental variable for the research quality of actual committee members. The estimated effect is slightly higher

when using this estimation method: authors with predatory publications have 7.1 percentage points (or about 19%) lower success rate relatively to the rest of the candidates if evaluators' research quality is one standard deviation higher. Remarkably, the effect of evaluators' research quality on the success of candidates with predatory publications is especially high in economics and business.

I also assess whether better researchers tend to value less other lower-tier publications, independently of whether these publications are predatory or not. I find that evaluators of better research quality are significantly less likely to value any publications that are not articles in high-impact journals (columns 2-3 of Table 6). The difference in the way evaluators of high and low research quality assess candidates' publications in high-impact journals can explain about 30% of the effect of committee research quality on the success of candidates with Beall's list publications.

6 Conclusions

I this paper I explore one potential explanation for the recent proliferation of journals with dubious non-academic practices. Over the last few year, the Open-Access model of publishing has gained substantial popularity. As compared to traditional journals, the survival of journals operating within the OA model depends more on the willingness of authors to publish their work in these journals than on the willingness of academic community to access articles published in these journals. While no one is willing to access and read articles of no scientific value, some authors may be willing to publish such articles if they expect the returns to these publications to be positive. I show that these returns are indeed positive when academic promotion committees are composed of evaluators of limited research quality.

I use data from the Italian national qualification evaluations carried out in 2012-2013, where about seventy thousand applications consisting of CVs and selected publications were evaluated by about two hundred committees. I match candidates' CVs with the list of dubious journals maintained by Professor Jeffrey Beall and I find that about 5% of CVs included publications from this list. In order to estimate the causal effect of committee research quality on the success of authors with Beall's list publications, I exploit the fact that evaluators were randomly assigned to evaluation committees from the pool of eligible evaluators in the corresponding discipline. I find that committees that by luck of the draw included evaluators with lower research quality were more likely to promote candidates with Beall's list publications.

This result hints at the importance of the quality of academic evaluation for a more general quality vs. quantity trade-off faced by many young researchers. Evaluators of lower research quality may overvalue lower-tier publications if they have problems with observing and appreciating the quality of research. This may push some young

researchers, especially based in lower-tier universities, to be more prolific while simultaneously be less demanding to the quality of their work. Overall the results are consistent with better researchers being more efficient in detecting good candidates and sorting out dubious research. Their better evaluations may in turn improve the incentive structure in academia and, perhaps, disincentivize academic fraud. Certainly, their opportunity cost of time is relatively high, and keeping them away from their main activity might have a substantial cost in terms of foregone scientific output. Yet, the results of this paper suggest that the expertise of top researchers may be also key to sustaining meritocracy in science, ensuring good incentives in academic community and raising the credibility of scientific research in the eyes of non-academic community.

References

Bagues, Manuel, Mauro Sylos-Labini, Natalia Zinovyeva (2015), "Connections in Scientific Committees and Applicants' Self-Selection: Evidence from a Natural Randomized Experiment', IZA discussion paper 9594.

Bohannon, John (2013), "Who's Afraid of Peer Review?", Science Vol 342.

Guiso, Luigi, Paola Sapienza, Luigi Zingales (2004), "The Role of Social Capital in Financial Development", *The American Economic Review*, 94 (3): 526-556.

John, L.K., Loewenstein, G., Prelec, D. (2012) "Measuring the prevalence of questionable research practices with incentives." *Psychological Science* 23 (5), 524-532.

Laakso M, Welling P, Bukvova H, Nyman L, Bj?rk B-C, Hedlund T (2011), "The Development of Open Access Journal Publishing from 1993 to 2009", PLoS ONE 6(6): e20961. doi:10.1371/journal.pone.0020961

List, J.A., Bailey, C.D., Euzent, P.J., Martin, T.L. (2001) "Academic economists behaving badly? A survey on three areas of unethical behavior." *Economic Inquiry* 39 (1), 162-170.

Merton, Robert K. (1957), "Priorities in Scientific Discovery: A Chapter in the Sociology of Science", *American Sociological Review*, Vol. 22(6), 635-659.

Necker, Sarah (2014), "Scientific misbehavior in economics", *Research Policy*, Vol. 43, 1747-1759.

Shen, C., B. Björk (2015) "?¿Predatory??' open access: a longitudinal study of article volumes and market characteristics." BMC Medicine, 13:230.

Stephan, Paula E. (2010), Economics of Science. In Hall, B. H. and N. Rosenberg, *Handbook of the Economics of Innovation*, pp. 217-273. Amsterdam and New York: Elsevier.

Xia J., Harmon, J.L., Connolly K.G., Donnelly, R.M., Anderson, M.R., Howard H.A. (2015) "Who publishes in 'predatory'?? journals?" Journal of the Association for Information Science and Technology, 66(7), July 2015, 1406-1417.

Table 1: Descriptive statistics – Applications

	All		Sciences		Medical Sciences		Engineering		Econ. & Business		Soc.Sc. & Hum.	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Individual characteristics:												
Female	0.38	0.49	0.39	0.49	0.37	0.48	0.22	0.42	0.37	0.48	0.44	0.50
Experience	15	8	16	7	18	8	13	6	11	6	15	8
Permanent position in the field of the call	0.42	0.49	0.36	0.48	0.42	0.49	0.49	0.50	0.41	0.49	0.44	0.50
Permanent position in another field	0.14	0.34	0.15	0.35	0.13	0.33	0.15	0.35	0.28	0.45	0.09	0.29
University location:												
- North	0.45	0.5	0.45	0.5	0.44	0.5	0.47	0.5	0.49	0.5	0.43	0.49
- Center	0.27	0.44	0.28	0.45	0.29	0.45	0.23	0.42	0.25	0.43	0.28	0.45
- South	0.28	0.45	0.28	0.45	0.27	0.44	0.3	0.46	0.26	0.44	0.29	0.46
Department research score	0.60	0.21	0.71	0.17	0.56	0.22	0.72	0.17	0.39	0.21	0.56	0.16
Publications (except Beall's list):	46	42	51	44	61	54	60	40	26	21	32	28
Journal articles	25	31	36	37	39	36	23	20	11	11	11	15
- Q1-journal articles	9	17	18	22	16	19	9	11	2	4	0.1	0.8
- A-journal articles	-		-		-		-		2	4	3	5
- Other articles in ISI/Scopus	10	16	15	18	19	20	11	11	4	6	1	3
- Other journal articles	5	9	3	5	5	8	3	5	5	7	7	13
Conference proceedings	8	15	8	14	7	15	28	25	3	7	3	5
Chapters	6	9	2	4	3	6	4	6	7	8	11	12
Books	2	3	0.5	1.6	0.8	2.2	0.9	2.1	2	3	4	4
Other publications	5	16	5	13	11	26	4	9	3	6	3	9
Proportion of journal articles in English	0.63	0.42	0.94	0.14	0.84	0.24	0.89	0.21	0.65	0.35	0.13	0.23
Articles in Beall's list journals	0.08	0.55	0.08	0.49	0.10	0.51	0.19	0.95	0.19	0.88	0.01	0.19
Beall's list articles per article	0.005	0.033	0.003	0.020	0.003	0.018	0.011	0.057	0.018	0.075	0.001	0.015
Beall's list articles per article in English	0.008	0.057	0.004	0.025	0.004	0.030	0.013	0.063	0.031	0.122	0.007	0.071
At least one article in Beall's list journals	0.05	0.22	0.05	0.23	0.07	0.25	0.10	0.30	0.10	0.29	0.01	0.08
Observations	69,020		19,164		15,418		6,813		6,005		21,620	

Notes: University location is identified for all applicants with a permanent or temporal position in an Italian university. Department research score is from the 2011 department assessment by ANVUR (*Valutazione della Qualitá della Ricerca*). Q1-journals are journals in the first quartile in the corresponding field in ISI Web of Knowledge in terms of the Article Influence Score. A-journals are high-impact journals in the fields of Economics, Business, Social Sciences and Humanities as defined by ANVUR expert committee. Publication data refer to publications between 2002 and 2012 listed in applicants' CVs.

Table 2: Descriptive statistics – Eligible Evaluators

	All		Sciences		Medical Sciences		Engineering		Econ. & Business		Soc.Sc. & Hum.	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Individual characteristics:												
Female	0.20	0.40	0.19	0.40	0.14	0.35	0.07	0.25	0.20	0.40	0.28	0.45
Experience	28	8	31	7	30	8	26	7	24	8	28	9
University location:												
- North	0.28	0.45	0.28	0.45	0.25	0.44	0.20	0.40	0.31	0.46	0.30	0.46
- Center	0.44	0.50	0.47	0.50	0.49	0.50	0.50	0.50	0.40	0.49	0.40	0.49
- South	0.28	0.45	0.25	0.44	0.26	0.44	0.29	0.45	0.29	0.45	0.30	0.46
Department research score	0.61	0.18	0.71	0.16	0.62	0.19	0.71	0.15	0.39	0.21	0.58	0.14
Publications:	74	61	83	63	113	81	99	65	40	26	54	37
Journal articles	37	46	58	49	81	66	36	30	14	12	16	18
- Q1-journal articles	13	26	28	29	35	39	14	17	2	3	0.1	0.52
- A-journal articles	3	7	-		-		-		3	5	6	9
- Other articles in ISI/Scopus	14	23	26	25	37	33	16	16	4	4	1	1
- Other journal articles	7	11	4	6	8	12	5	7	7	8	9	14
Conference proceedings	13	25	12	24	14	23	50	41	5	9	4	7
Chapters	14	16	4	7	6	9	7	11	13	12	24	18
Books	4	6	1.3	3.8	1.7	3.6	2	3	5	5	8	7
Other publications	5	15	7	18	10	26	4	9	3	4	3	9
Proportion of journal articles in English	0.53	0.43	0.96	0.06	0.86	0.18	0.89	0.17	0.53	0.35	0.10	0.19
Articles in Beall's list journals	0.08	0.49	0.11	0.51	0.15	0.68	0.16	0.76	0.15	0.64	0.003	0.057
Beall's list articles per article	0.003	0.026	0.002	0.011	0.003	0.011	0.005	0.027	0.014	0.069	0.0002	0.003
Beall's list articles per article in English	0.006	0.051	0.002	0.012	0.003	0.015	0.006	0.030	0.028	0.127	0.002	0.035
At least one article in Beall's list journals	0.05	0.22	0.07	0.25	0.09	0.29	0.08	0.27	0.09	0.28	0.003	0.057
Observations	5,876		1,095		1,046		674		624		2,437	
Committees	184		38		44		27		15		60	

Notes: Reported information is for eligible evaluators who are based in Italian universities. University location is identified for all applicants with a permanent or temporal position in an Italian university. Department research score is from the 2011 department assessment by ANVUR (*Valutazione della Qualitá della Ricerca*). Q1-journals are journals in the first quartile in the corresponding field in ISI Web of Knowledge in terms of the Article Influence Score. A-journals are high-impact journals in the fields of Economics, Business, Social Sciences and Humanities as defined by ANVUR expert committee. Publication data refer to publications between 2002 and 2012 listed in applicants' CVs.

Table 3: What predicts publishing in Beall's list?

	1	2	3	4	5	6
	All	Disciplinary area:				
		Sciences	Engineering	Medical sc.	Econ.&Bus.	Soc.Sc.&Hum.
Q1 or A-journal articles	−0.006***	−0.006***	−0.008**	−0.007***	−0.013***	−0.001**
	(0.001)	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)
Others articles in ISI or Scopus	0.013***	0.017***	0.015***	0.018***	0.011**	0.004***
	(0.001)	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)
Other journal articles	0.011***	0.010***	0.019***	0.014***	0.031***	0.001
	(0.001)	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)
Books	0.003***	0.004**	0.003	0.008***	0.004	0.001
	(0.001)	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)
Chapters	0.008***	0.012***	0.015***	0.005**	0.004	0.001**
	(0.001)	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)
Proceedings	0.005***	0.001	0.003	0.007***	0.024***	0.001
	(0.001)	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)
Other publications	0.007***	0.013***	0.016***	0.008***	−0.001	0.001
	(0.001)	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)
Prop. English-language articles	0.028***	0.030**	0.077***	0.045***	0.060***	0.027***
	(0.004)	(0.013)	(0.021)	(0.011)	(0.015)	(0.003)
Experience	−0.002***	0.002	−0.003	−0.004**	−0.008**	−0.002***
	(0.001)	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)
Female	−0.003*	−0.004	−0.016*	0.002	−0.016**	−0.001
	(0.002)	(0.004)	(0.009)	(0.004)	(0.008)	(0.001)
Non-tenured university position	0.026***	0.036***	0.119***	0.004	0.031*	0.002
	(0.005)	(0.012)	(0.025)	(0.011)	(0.019)	(0.004)
University ranking	−0.045***	−0.033**	−0.143***	−0.045***	−0.105***	−0.005
	(0.006)	(0.013)	(0.027)	(0.013)	(0.025)	(0.005)
Fixed univ. position in the same field	0.004	−0.014***	0.012	0.020***	0.021	0.001
	(0.003)	(0.006)	(0.012)	(0.007)	(0.014)	(0.002)
Fixed univ. position in other field	0.004	−0.004	−0.013	0.018**	0.008	0.008***
	(0.003)	(0.006)	(0.014)	(0.009)	(0.014)	(0.002)
Central Italy	0.005**	−0.006	0.011	0.010*	0.006	0.005***
	(0.002)	(0.005)	(0.011)	(0.006)	(0.010)	(0.002)
Southern Italy	0.030***	0.031***	0.047***	0.037***	0.058***	0.005***
	(0.002)	(0.005)	(0.010)	(0.006)	(0.011)	(0.002)
Constant	0.026***	0.020	0.005	0.022**	0.047***	0.001
	(0.003)	(0.013)	(0.020)	(0.010)	(0.012)	(0.001)
Mean dependent variable	0.050	0.054	0.099	0.066	0.096	0.007
Exam FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.058	0.042	0.056	0.033	0.065	0.020
Observations	69020	19164	6813	15418	6005	21620

Note: OLS estimates. Dependent variable is an indicator for authors who have publications in Beall's list journals. All productivity indicators in the prediction model exclude publications in Beall's list. Productivity indicators and experience are normalized to have zero mean and unit standard deviation for all applicants in a given field and category.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Evaluation outcomes and predatory authors

	1	2	3	4	5	6	7
	All	All	Disciplinary area:				
			Sciences	Medical Sc.	Engineering	Econ&Bus	Soc.Sc.&Hum
Q1 or A-journal articles	0.125***	0.125***	0.135***	0.081***	0.153***	0.161***	0.081***
	(0.007)	(0.007)	(0.018)	(0.013)	(0.011)	(0.022)	(0.006)
Other articles in ISI or Scopus	0.029***	0.029***	0.035***	0.059***	0.044***	0.009	0.005
	(0.004)	(0.004)	(0.009)	(0.009)	(0.014)	(0.013)	(0.003)
Other journal articles	−0.006**	−0.006**	−0.001	−0.009	0.004	−0.013	−0.011**
	(0.003)	(0.003)	(0.006)	(0.006)	(0.005)	(0.008)	(0.004)
Proceedings	0.012***	0.012***	−0.005	0.076***	0.000	0.013	0.019***
	(0.004)	(0.004)	(0.010)	(0.009)	(0.005)	(0.012)	(0.005)
Books	0.009***	0.009***	−0.004	0.007	−0.008*	0.001	0.034***
	(0.003)	(0.003)	(0.006)	(0.006)	(0.004)	(0.011)	(0.004)
Chapters	0.038***	0.038***	0.030***	0.013**	0.028***	0.042***	0.056***
	(0.003)	(0.003)	(0.005)	(0.006)	(0.005)	(0.014)	(0.004)
Other publications	−0.009***	−0.009***	−0.014**	−0.007	−0.002	−0.017**	−0.006*
	(0.003)	(0.002)	(0.005)	(0.008)	(0.006)	(0.006)	(0.003)
Experience	0.008**	0.008**	0.005	−0.005	0.002	−0.015	0.022***
	(0.004)	(0.004)	(0.009)	(0.008)	(0.005)	(0.009)	(0.005)
Non-tenured university position	−0.096***	−0.096***	−0.112***	−0.127***	−0.163***	−0.014	−0.050***
	(0.018)	(0.018)	(0.032)	(0.043)	(0.032)	(0.038)	(0.017)
Fixed university position in the same field	0.255***	0.255***	0.221***	0.318***	0.196***	0.303***	0.280***
	(0.011)	(0.011)	(0.024)	(0.018)	(0.023)	(0.033)	(0.014)
Fixed university position in other field	0.017	0.017	0.043**	−0.075**	−0.021	0.091**	0.025
	(0.012)	(0.012)	(0.018)	(0.033)	(0.029)	(0.036)	(0.017)
University score	0.161***	0.160***	0.126***	0.207***	0.261***	0.027	0.153***
	(0.026)	(0.026)	(0.038)	(0.056)	(0.045)	(0.071)	(0.029)
University location:							
- Central Italy	−0.023***	−0.023***	−0.022**	−0.019	−0.015	−0.037*	−0.012
	(0.007)	(0.007)	(0.010)	(0.017)	(0.023)	(0.018)	(0.011)
- Southern Italy	−0.040***	−0.040***	−0.064***	−0.044**	−0.020	−0.064***	−0.018*
	(0.008)	(0.008)	(0.014)	(0.019)	(0.020)	(0.019)	(0.011)
Predatory author		−0.025*	−0.042*	−0.051**	−0.006	0.012	−0.012
		(0.013)	(0.021)	(0.024)	(0.017)	(0.048)	(0.041)
Exam FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-Squared	0.167	0.167	0.174	0.209	0.157	0.134	0.178
Observations	69020	69020	19164	15418	6813	6005	21620

Note: OLS estimates. Standard errors are clustered at the field level. Dependent variable takes value one if the applicant is granted a qualification. Research productivity indicators and experience are normalized for researchers applying to the same position and field.
* p < 0.10, ** p < 0.05, *** p < 0.01.

Table 5: Effect of committee research quality on the success of predatory authors

	1	2	3	4	5	6	7
			Disciplinary area:				
			Sciences	Engineering	Medical Sc.	Econ&Bus	Soc.Sc.&Hum
	ITT	ATET	ATET	ATET	ATET	ATET	ATET
Predatory author	−0.022	−0.022	−0.045**	−0.060**	−0.009	0.045	0.003
	(0.013)	(0.013)	(0.021)	(0.024)	(0.019)	(0.038)	(0.051)
Predatory author * Evaluators' research quality	−0.067**	−0.071**	−0.108***	−0.047	0.030	−0.370***	−0.023
	(0.033)	(0.035)	(0.039)	(0.060)	(0.046)	(0.116)	(0.153)
Exam FE	Yes	Yes	Yes	Yes	Yes	Yes	
Adj. R-Squared	0.239	0.239	0.233	0.295	0.265	0.232	0.260
Observations	69020	19164	6813	15418	6005	21620	

Note: Dependent variable takes value one if the applicant is granted a qualification. Evaluators' research quality is measured as the number of Q1 articles in STEM&M fields and as the number of A-journal articles in Economics and Business, Social Sciences and Humanities. It is normalized for all eligible evaluators in a given field. In column 1, the estimate is the intention-to-treat (ITT) effect. In columns 2-7, the research quality of actual evaluators is instrumented by the research quality of evaluators initially selected by the random draw (the estimated effect is the average treatment effect on the treated, ATET). Standard errors are clustered at the field level. All regressions also include an interaction between the proportion of articles in Beall's list and the expected evaluators' research quality, which is obtained based on one million simulated draws from the pool of eligible evaluators.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Do better researchers disregard only predatory articles or any articles in lower-tier journals?

	1	2	3
Q1 or A-journal articles	0.125***	0.124***	0.124***
	(0.007)	(0.007)	(0.007)
Other ISI or Scopus articles	0.029***	0.029***	0.030***
	(0.004)	(0.004)	(0.004)
Other journal articles	−0.006**	−0.006**	−0.006**
	(0.003)	(0.003)	(0.003)
Proceedings	0.012***	0.012***	0.013***
	(0.004)	(0.004)	(0.004)
Books	0.009***	0.009***	0.009***
	(0.003)	(0.003)	(0.003)
Chapters	0.038***	0.039***	0.038***
	(0.003)	(0.003)	(0.003)
Other	−0.009***	−0.009***	−0.008***
	(0.002)	(0.002)	(0.003)
Predatory author	−0.022	−0.023*	−0.034**
	(0.013)	(0.013)	(0.015)
Predatory author * Evaluators' research quality	−0.071**	−0.051	−0.056
	(0.035)	(0.034)	(0.035)
Q1/A-journal articles * Evaluators' research quality		0.020	0.018
		(0.018)	(0.015)
All other publications * Evaluators' research quality		−0.032**	
		(0.014)	
Other ISI or Scopus articles * Evaluators' research quality			−0.015
			(0.011)
Other journal articles * Evaluators' research quality			−0.003
			(0.006)
Proceedings * Evaluators' research quality			−0.020**
			(0.009)
Books * Evaluators' research quality			−0.001
			(0.007)
Chapters * Evaluators' research quality			−0.005
			(0.009)
Other * Evaluators' research quality			−0.009
			(0.006)
Exam FE	Yes	Yes	Yes
Observations	69020	69020	69020

Note: Dependent variable takes value one if the applicant is granted a qualification. Evaluators' research quality is measured as the number of Q1 articles in STEM&M fields and as the number of A-journal articles in Economics and Business, Social Sciences and Humanities. It is normalized for all eligible evaluators in a given field. The research quality of actual evaluators is instrumented by the research quality of evaluators initially selected by the random draw. All regressions also include an interaction between the proportion of articles in Beall's list and the expected evaluators' research quality, which is obtained based on one million simulated draws from the pool of eligible evaluators. Standard errors are clustered at the field level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.