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Do the best scholars attract the highest speaking fees? An exploration of internal and external influence

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Abstract This study investigates whether academics can capitalize on their external prominence (measured by the number of pages indexed on Google, TED talk invitations or New York Times bestselling book successes) and internal success within academia (measured by publication and citation performance) in the speakers' market. The results indicate that the larger the number of web pages indexing a particular scholar, the higher the minimum speaking fee. Invitations to speak at a TED event, or making the New York Times Best Seller list is also positively correlated with speaking fees. Scholars with a stronger internal impact or success also achieve higher speaking fees. However, once external impact is controlled, most metrics used to measure internal impact are no longer statistically significant.

Keywords Academic performance · Scholarly Importance · Social importance of scientists · External and internal influence · Book prizes · Book bestsellers · TED talks

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> One of the problems of our time is to overcome attitudes that tend to justify and reinforce the isolation of the scientific community. We must open new channels of communication between science and society.
> Prigogine and Stengers (1984, p. 22)

> When we, as scientists, build and use tools and infrastructure that support open dissemination of actionable, accessible and auditable metrics, we will be on our way to a more useful and nimble scholarly communication system.
> Piwowar (2013, p. 159)

> 'Publications' is just one mode of making public and one way of validating scholarly excellence. It is time to embrace the Web's power to disseminate and filter scholarship more broadly and meaningfully. Welcome to the next era of scholarly communication.
> Priem (2013, p. 440).

Introduction

A scientist's primary goal is the advancement of knowledge. Scholarly activity can take on multiple forms, ranging from conducting purely scientific research to offering policy recommendations. Scholars are expected to perform well across several different arenas that can be classified as either *internal* or *external.* Research and participation in academic self-governance are *internal*, while engagement in the general societal discourse (i.e. private institutions, government or civil society) is *external* to the academic system (see Aguinis et al. 2012). In other words, internal impact refers to the impact of the research upon other scholars (or scholarly organization) within the realm of academia while the latter is the ability to influence any other non-academic institutions or people outside academia. Thus, measures of external impact involve assessment of much broader societal level proxies for influence. Teaching lies in between: its influence is internal as long as the students are at the university, and it is external once the former students are working as professionals in society beyond academia.

However, the impact of scholars has primarily been analyzed by investigating *internal* impact via measures such as citations or publication counts. The use of such metrics dates back to as least as far as the 18th century when publication counts were practiced in the legal field (Shapiro 1992); appeared prominently in a paper on citations by Gross and Gross (1927) in *Science*; experienced a sharp surge in the late 1960s (Glänzel and Schoepflin 1994); and still are becoming increasing popular in evaluating the performance of scientists (Radicchi et al. 2008). Inherent in the counting of publications and citations we find the most fundamental social processes of science: success in communicating and exchanging research findings and results (Fox 1983). It is seen by many as the ultimate indicator of effectiveness (Certo et al. 2010). However, Henrekson and Waldenström (2011), for example, asked the question: "Should we give weight to research's impact outside academia, such as influence on policy-making or the policy debate? (p. 1154)". Aguinis et al. (2012) paraphrase Donald C. Hambrick, a former Academy of Management president, when criticizing that "the way we currently assess the impact of our scholarly work seems to be based on an incestuous, closed loop" (p. 106). According to Aguinis et al. (2012), even the applied area of management has achieved limited success in making a substantial impact on stakeholders outside the university. The limited research available reveals no, or only a low, correlation between external and internal influence among scholars in management (Aguinis et al. 2012) and economics (Chan et al. 2013). Those studies look at the correlation between academic performance (publications, citations) and external influence as measured by the number of pages indexed on the search engine Google. Quantifying performance based on pages indexed on the Internet is incomplete as what it does not take into account is the relative value of the information on such pages. One single page referencing a scholar's name may be of great importance, but it may also be close to meaningless. We therefore extend the previous research by approximating the relevance of a scientist's contributions by measuring an audience's willingness to pay in the speakers' market.

This paper analyzes whether scholars better known to the general public earn higher speaking fees than scholars with superior research performance within academia. We find that both external prominence and internal impact can be capitalized on the speakers' market although external prominence has a stronger impact. Once the number of pages indexed by Google is controlled (excluding Google.edu entries) as an external influence proxy, most internal impact factors lose their statistical significance.

Provided the willingness to pay for scholars in the speakers' market correctly reflects the relevance of their knowledge for practical issues, our results raise the question of the extent to which academic research is of interest to the public (see, e.g., Frey 2006; Van Bergeijk et al. 1997; Van de Ven and Johnson 2006). The findings may be seen as an indication of a considerable gap between scholarly research and practical pertinence. This paper is organized as follows: "Scholarly impact" section aims at clarifying the motivation of the current analysis by providing a short overview of what we know so far regarding scholarly impact. Section "Data" describes the data collection process. Estimation results are presented in "Estimation results" section followed by the discussion and conclusion in "Discussion and conclusions" section.

Scholarly impact

Several countries such as the United Kingdom, Australia, Italy, New Zealand, and Germany have moved towards a national performance-based research evaluation model, which employs impact factor as an instrument for assessment (Cameron 2005; Thelwall 2008; Owens 2013). Such metrics are also used in hiring and tenure decisions. Committee members often struggle with the task of reading an entire body of work when academics are considered for promotion. This increases the incentive to take shortcuts (Priem and Hemminger 2010) and assess a candidate based only on the journal impact factors (Cameron 2005). Moreover, due to article overload (Priem and Hemminger 2010; Torgler and Piatti 2013), readers searching for articles will also look for shortcuts, and therefore employ identifiable indicators such as journal quality or former article citation performance to evaluate whether it is worth looking at an article. However, the US National Science Foundation has started to ask principal investigators to list their "products" rather than "publications" in the biographical overview, which takes into account the breadth of intellectual possibilities such as data sets, software, patents, copyrights or other non-traditional products (Piwowar 2013).

Van Raan (1997) states that one of the core interests of scientometric research is the "development of methods and techniques for the design, construction, and application of quantitative indicators on important aspects of science and technology" (p. 206). Thelwall (2008) points out that in the last 50 years there have been two major changes in the way research can be quantitatively analyzed. The first was the creation of the Institute for Scientific Information database in 1962 and the second was the Web publishing covering a broad range of research-related documents. We can now observe a renaissance of new initiatives attempting to measure scientific impact, from usage log data, to distributional statistics, and sophisticated social network approaches (Bollen et al. 2009). Thelwall and Harries (2004) are critical of how quantitative research has historically been restricted to formal communication (journals and books), but the Web allows new complementary approaches to be derived. Many altmetrics have emerged for tracking public attention. For example, journals such as *PLoS ONE* have started to provide metrics for each online published article (views, downloads, cites, saves and discussions (e.g., Twitter, Facebook, Comments, Google blogs). Receiving attention is a sign of success (Franck 1999), and the Web is able to collect previously hidden information on these signs of success, while allowing scientific information to be distributed widely via videos, slides, blog posts, Twitter etc. (Letierce et al. 2010). Data repositories such as figshare track downloads and are increasing in popularity. In addition, there is a tendency to extend the traditional measures of scholarly importance beyond the academic environment. Piwowar (2013) argues that these kind of "altmetrics give a fuller picture of how research products have influenced conversation, thought and behavior. Tracking them is likely to motivate more people to release alternative products—scientists say that the most important condition for sharing their data is ensuring that they receive proper credit for it" (p. 159). The editorial of the renowned scientific journal *Nature* (2013) has emphasized: "The conventional measures of scholarly importance—citation metrics, publication in influential journals and the opinion of peers as expressed in letters and interviews—still loom large. But to those are now added metrics such as article downloads and views, and measures of importance beyond the academic realm, including influence on policy-makers or health and environmental officials, effects on industry and the economy, and public outreach" (p. 271). Holbrook et al. (2013) published a list of 33 positive and negative indicators of impact in *Nature*, differentiating between public engagement, academic community, and the media.

Reward mechanism

Scientists play an important role in the creation and dissemination of knowledge in society (Gomez-Mejia and Balkin 1992). However, it is not clear whether scientists are actually paid according to the importance of this role. So far, the main focus of the literature has been on the determinants of university pay. However, fiscal constraints at universities produce interest in exploring opportunities for financial reward outside the academic community. The determinants of a society's reward structure has been identified as an important question (Acemoglu 1995).

The fee a speaker can command is a professional and commercial assessment of academics' or public figures' worth in the marketplace. It is a method of quantifying how the ability of these figures is judged beyond academic success, and how society evaluates the (professional) importance and interest of speakers (societal appraisal). We currently have no understanding as to what drives success in this market. The literature has primarily maintained an intense focus on how internal impact influences academic salaries, finding a positive correlation between academic performance and salary (see, e.g., Katz 1973; Hansen et al. 1978; Hamermesh et al. 1982; Diamond 1986; Kenny and Studley 1995; Moore et al. 1998; Bratsberg et al. 2003; Duncan et al. 2004). Performance proxies are linked to reward systems in academia as actual effort or intentions cannot be observed publicly (Dasgupta and David 1994). Diamond (1986), for example, asked the question: "What is a citation worth?" After summarizing several studies, he concludes that citations have positive and significant effect on earnings. For example, he demonstrates that the marginal value of a citation when the level of citations is zero is between $50 and $1,300.

However, the marginal value depends on practices within disciplines. For example, the quantity of publications and citations tend to be relatively low in disciplines such as economics and mathematics, hence a citation's marginal value is higher when compared to fields such as chemistry or physics. Kenny and Studley (1995) found that publications and citations together account for 20 percent of the salaries in their data sample.

Public speaking engagements by academics give business conferences and meetings both internal and external status and credibility. It comes as no surprise that some academics now advertise their speaking services globally across a range of public speaking and toastmaster websites. In this competitive market, speaking fees reveal the willingness to pay according to the perceived value or contribution of a scientist, and the public interest in the commodity that the scientist provides. This paper seeks to quantify what influences the attractiveness (and hence the commercial value) of scientists.

Social effects

An understanding of what influences speaking fees requires a closer look at the importance of external impact. In recent times there has been a stronger emphasis on accounting for the social effects of science. For example, Frodeman and Holbrook (2007) report that in 2001 the National Science Foundation informed scientists that failing to address the connection between research and its broader effects on society in grant proposals would result in the proposal being returned without review. Since the 1980s, the UK Economic and Social Research Council requires its grant applicants to demonstrate how they will deliver practitioner-relevant outputs (John 2012).

Dasgupta and David (1994) states: "To say what goes on within the sphere of human activities identified as 'The Republic of Science' has grown too important for the rest of society to leave alone is also something of a commonplace assertion" (p. 488). Frodeman and Holbrook (2007) stress that "it is no longer accepted that scientific progress automatically leads to societal progress" (p. 29). John (2012) notes that: "There is a revolution in information afoot whereby anyone can produce output that can feed swiftly into public debate. The rapid development of the internet, in particular social media such as Twitter, weakens the power of traditional gatekeepers and creates opportunities for entrepreneurial advocates and communicators" (p. 18). The social function of science is not a new topic (see, e.g., Bernal 1939). In discussing Bernal's book, Merton (1941) points out: "More recently, a changing social structure, which aroused Frankensteinian guilt-feelings and a correlated sense of social responsibility, has induced a considerable body of scientists to consider the social role of science" (p. 622).

Scientists have been criticized for misunderstanding media (Crichton 1999). Crichton, a renowned writer and film director suggests: "You need working scientists with major reputations and major accomplishments to appear regularly on the media, and thus act as human examples, demonstrating by their presence what a scientist is, how a scientist thinks and acts, and explaining what science is about" (p. 1463). Many scientists have expressed the concern that popularization would reduce their status among their peers (Willems 2003). The environment does not provide sufficient encouragement to be involved in public dissemination of information (Dunwoody and Ryan 1985). However, survey results obtained by Peters et al. (2008) discover that researchers see increasing the public's appreciation of science as the most important reason to motivate interaction with the media. Kidd (1988, p. 127) argues that one of the most compelling arguments in favor of popularization of science is an increasing proportion of public policy decisions that have a scientific or technical aspect while the well-being of society depends on well-informed citizenry.

There is a trend among researchers and academic institutions towards establishing a stronger tie between science and society (Jensen et al. 2008). The Royal Society dedicated in 2006 a report entitled Science Communication to survey factors affecting science communication by scientists and engineers. Martin Rees (at that time the President of the Royal Society) emphasized in his foreword that "Scientists need to engage more fully with the public. The Royal Society recognises this, and is keen to ensure that such engagement is helpful and effective. The role of science in public policy is becoming even more pervasive. Many scientists are willing to engage in dialogue and debate, but they need encouragement and guidance, and they need to feel that their efforts are valued".[1] In 2013, *PNAS*, the flagship journal of the National Academy of Sciences organized a special issue on the science of science communication edited by Baruch Fischhoff and Dietram Scheufele. They state that "[m]aking the most of what science has to offer society requires the give-and-take of two-way communication with laypeople. Those interactions can be direct, as in classrooms and social settings, or indirect, through the mediation of research helping scientists to understand the public and vice versa" (Fischhoff and Scheufele 2013, p. 14031). The LSE Public Policy Group has even developed a handbook for social scientists entitled "Maximizing the Impacts of your Research".[2] The second part of the report is entirely dedicated to generating impact beyond academia. A study using records of more than 3500 scientists over a three-year period (2004–2006) in France indicate that dissemination activities are neither bad nor good for scientists' careers. However, it has a positive effect on promotions. In addition, scientists who are more engaged in dissemination are also more academically active (Jensen et al. 2008).

Data

Speaking fees

It is very difficult to consistently measure speaking fees paid to scholars. Systematic data on the remuneration for such activity across countries is limited (Hosp and Schweinsberg 2006). Many, if not most, academics do not ask for any money if they are invited to present a keynote address to a scientific society or to give a lecture at a research seminar. In contrast, they often try to maximize their remuneration if they are invited by a for-profit institution.

The data regarding speaking fees were collected during December 2013 and January 2014 from the website of eight speaking agencies, including *BigSpeak Speakers Bureau,*[3]*Keppler Speakers*[4]*Leading Authorities Speakers Bureau,*[5]*Premiere Motivational Speakers Bureau,*[6]*Speakerpedia*[7], *Speakers Platform,*[8]*the Sweeney Agency*[9] and

[1] http://www.ulb.ac.be/inforsciences2/communication/coursComm/docs/royal_society.pdf.

[2] http://blogs.lse.ac.uk/impactofsocialsciences/book/.

[3] http://bigspeak.com/.

[4] http://kepplerspeakers.com/.

[5] http://leadingauthorities.com/.

[6] http://premierespeakers.com/.

[7] http://speakerpedia.com/.

[8] http://speakersplatform.com/.

[9] http://thesweeneyagency.com/.

Washington Speakers Bureau.[10] Each site lists the speaking fees, the biography and the contact information of the speaker. In most cases, the speaking charges are listed in a range (e.g., \$7,500–\$12,500 or \$50,000+), since the *exact* charges might vary due to the location and type of invitation. Hence, we take the lower end of the fee range to consistently measure the minimum speaking charges for the speaker (unless no range is specified).[11] In addition, if a speaker is listed on more than one agency website, we use the highest of the lower end range values as the speakers' charge. The minimum speaking fees reported range from \$750 to \$250,000. We exclude from the sample those speakers who do not disclose speaking fee charges. Moreover, in addition to the biography of the speakers, the speaking agencies also classify speakers into different categories, for example, *Speakerpedia* classifies speakers into twelve categories such as "Arts and Humanities", "Business", "Government & Policy", and "Internet & Technology". With such information, we are able to differentiate academic speakers from non-academic speakers working in specific fields by using a set of strings as filter.[12]

Furthermore, with automated word searches within speakers' biographies, we are able to classify speakers' fields into three disciplines, namely, (1) *natural science* (e.g., biology, medicine and physics), (2) *social science (business)* (e.g., economics, finance, management and marketing) and (3) *social science (others)* (e.g. psychology, sociology, and politics). It is important to differentiate between fields as disciplinary practices and conventions affect the scientist's role in the production and dissemination of knowledge, and influences how information and communication technologies and the Internet are used (Barjak et al. 2007). Next, we categorize speakers into three categories according to the degree of academic involvement. By examining the speakers' CVs, LinkedIn[13] and Wikipedia pages, we define someone as a "full-time" academic if the speaker has spent more than half of his/her career as a researcher in an academic institution or organization. On the other hand, a "part-time" academic has spent more than half of his or her career in a private or government institution while still being affiliated for some of the period in academia. We then define a speaker as non-academic if he or she has never worked in or been affiliated with an academic institution. Table 1 provides the sample sizes of these different categories and Fig. 1 depicts the distribution of minimum speaking fees by the degree of academic involvement and professional field. We observe that all distributions of speaking fees are positively skewed. The speaking fee distribution between academic and non-academic speakers is not significantly different although mean value is higher for academic speakers (p value of the Kolmogorov–Smirnov test equals 0.076). Among academics, the distributional difference between part-time and full-time academics is also not significant ($p = 0.311$). However, we find that the distribution of speaking fees for academic speakers who are in business related disciplines is different from academics with natural science ($p < 0.000$) and other social science background ($p < 0.000$), and the latter two disciplines share similar distribution ($p = 0.877$). A similar pattern is observable between disciplines when focusing only on academics.

[10] http://washingtonspeakers.com/.

[11] Only 3.79 % (22 speakers) have no fee range.

[12] We first use the combination of the words "professor", "director", "fellow" and suffix such as "-mist", "-logist", "-icist" with words like "university", "college", or "institute" to identify whether the speaker is a scientist. Then, we search for prefix such as "econ", "bio", "phy", "psy" and "medic" to classify speakers into in the fields in which they are active. To ensure the accuracy of this automated filtering, we perform a manual Google search on the career field of speakers who are filtered out.

[13] https://www.linkedin.com/.

Table 1 Sample size by academic involvement and fields

Academic involvement/ fields	Natural science	Social science (business)	Social science (others)	Total
Part-time academic	31	61	32	124
Full-time academic	52	88	50	190
Non-academic	73	127	66	266
Total	156	276	148	580

External influence

Number of pages as indexed by Google

The Web is becoming crucial as an information interface, hosting a large variety of academic information (Thelwall and Price 2003). The external importance of a speaker (prominence) in the public is measured by the number of web pages referring to a speaker's name. It is also an indicator of visibility. We first conducted an automated search on 14 April, 2014 via the Google search API (application programming interface) to obtain the number of hits.[14] In addition, we obtained the number of non-education domain web pages to reflect the external prominence of academics. To capture the most accurate number of searches, we used the publication names for speakers who have published a book or a scientific article, typically appearing in the form of "[*first name*] [*initial of the middle name*] [*surname*]" or just "[*first name*] [*surname*]". A double quote is placed before and after the search item, i.e. the speaker's name, to generate results of the exact search phrase. The first 50 pages returned were then manually checked to identify names with spurious matches. If five or more pages (10 %) were not attributed to the speaker, we excluded the person from the sample, which resulted in a total sample size of 580 speakers.[15] Google index pages afford the opportunity to also cover some of the more informal scholarly communication[16] (all other forms of communication beyond publications).

The left-hand side of Fig. 2 shows the distribution of the number of indexed pages. As evidenced, the distribution is highly skewed. The right-hand side shows what we would call a "Google index page Lorenz curve," thereby providing an impact inequality proxy for all the speakers. This figure reveals a significant level of impact inequality (Gini coeff. = 0.85); for example, 20 % of the speakers are responsible for almost 90 %of the indexed pages.

TED talks

It is something of an understatement to say that the Internet has become a very important source of information. The Science and Engineering Indicators 2014 provided by the National Science Foundation reports that around 4 in 10 Americans cited the Internet as their primary source of science and technology information in 2012.[17]

[14] There are, of course, other possible methods by which we could measure external impact. For an overview, see Chan et al. (2013).

[15] 154 speakers are excluded from all 734 eligible speakers filtered out by the automated search due to spurious name matches.

[16] For a discussion regarding informal and formal communication see Kousha and Thelwall (2007).

[17] http://www.nsf.gov/statistics/seind14/index.cfm/chapter-7/c7h.htm.

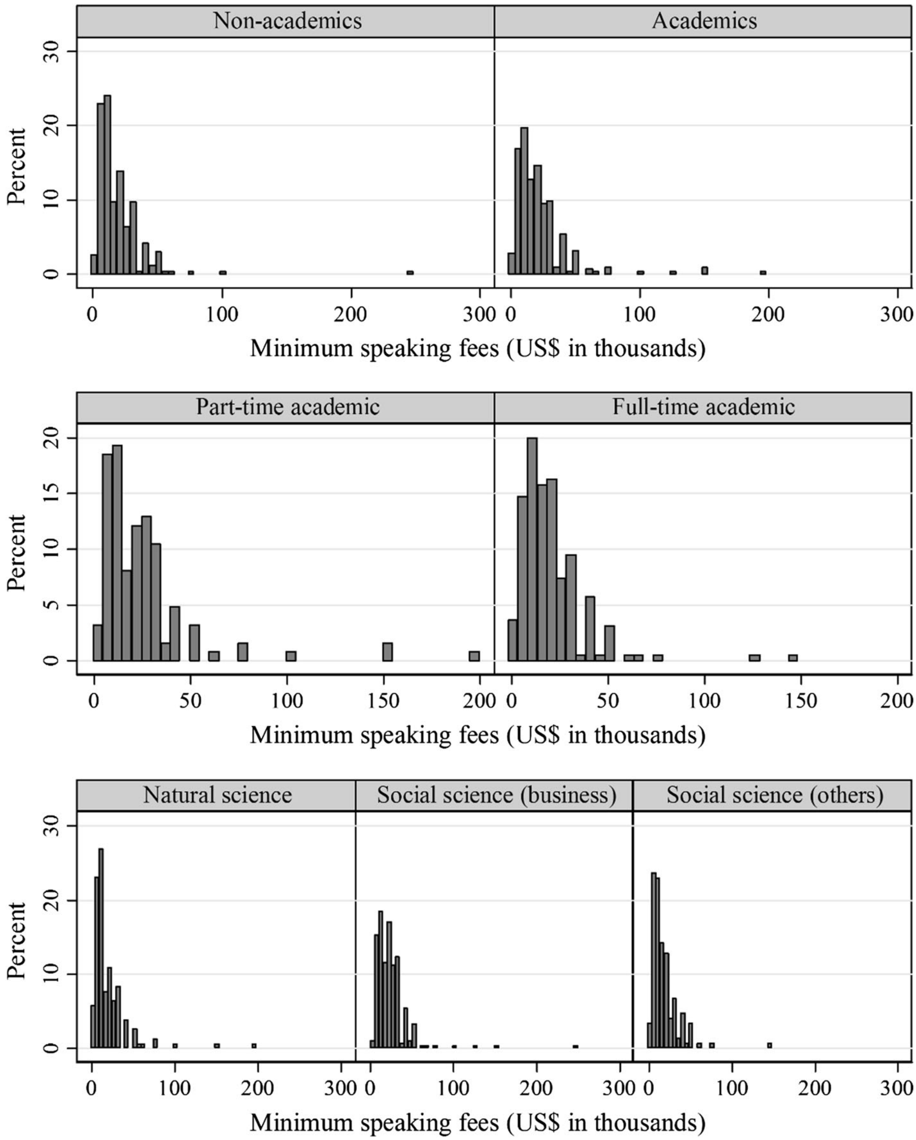

Fig. 1 Distribution of minimum speaking fees

We are going to take a closer look at TED talks who have become internationally very famous. TED started in 1984 as a conference for speakers in the area of technology (T), entertainment (E), and design (D) to discuss their best ideas (Rubenstein 2012). TED's mission is to build "a clearinghouse of free knowledge from the world's most inspired thinkers" (http://www.ted.com/pages/about/). The most popular TED talk as of December

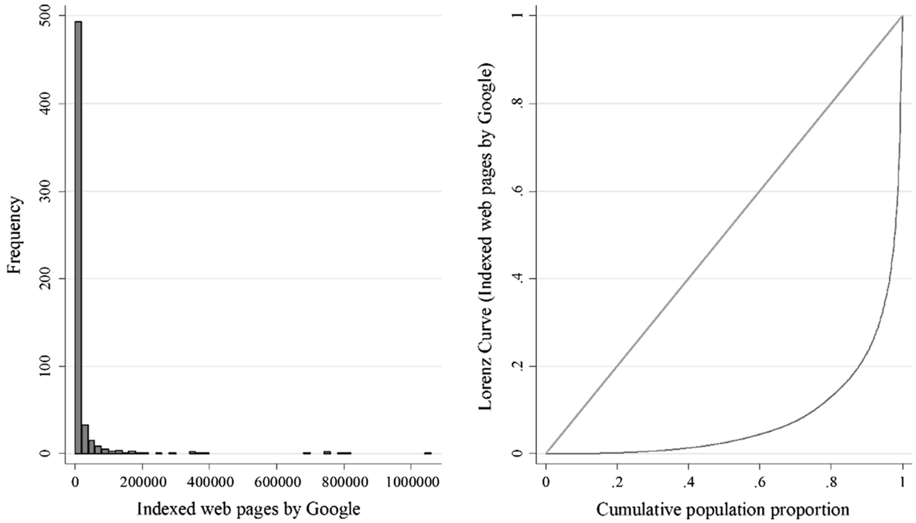

Fig. 2 Impact inequality

2013 was Sir Ken Robinson's *How Schools Kill Creativity*[18] (Feb 2006) with 23,510,221 views.[19] In 2012, TED reached 1.5 million views per day.[20]

For our analysis, we check whether the speakers were invited to present at conferences held by *TED Conferences, LLC* before 2013. This includes the main TED conferences, TEDGlobal, TEDMed and other TEDx events.[21] Surprisingly, to the best of our knowledge, the implication of TED talks has hardly been analyzed so far in academic journals (exceptions are Sugimoto and Thelwall 2013; Rubenstein 2012). Sugimoto and Thelwall (2013) point out that online videos provide a novel platform for popularizing science, and that tracking online interaction can act as attention metrics that could feed into new forms of academic capital. Moreover, positive affirmations in this environment may encourage scholars to be active on these platforms.

Books and their recognition

In a study of 148 full professors in economics, Hamermesh et al. (1982) were not able to detect a positive impact of book publication on earnings. On the contrary, in one specification, the coefficient of the variable 'books' was even negative and statistically significant. However, Katz (1973) studied a substantial cross-section of disciplines and found that books had a positive influence on salary. The publication of a book was worth an extra $230 in a professor's lifetime while an extra publication was worth $18. Finkenstaedt (1990) discusses the measurement of research performance in the humanities, highlighting the importance of books: "And the book addressed to the good old common reader is

[18] http://www.ted.com/talks/ken_robinson_says_schools_kill_creativity.

[19] http://blog.ted.com/2013/12/16/the-most-popular-20-ted-talks-2013/. As of April 30, 2014 it had attracted 26,222,340 views.

[20] http://blog.ted.com/2012/11/13/ted-reaches-its-billionth-video-view/.

[21] The list of TED speakers is extracted from https://www.ted.com/talks/list/.

probably more valuable for society than a specialised article—in spite of its many citations. It may even be that case that the common reader does not get the books he deserves because a mistaken idea of "impact" makes the junior staff publish articles instead of readable books" (p. 414). Bratsberg et al. (2003) employ a large dataset of 1897 observations on 176 faculty members at five universities and observe a positive, highly statistically significant relationship between books and earnings. On the other hand, Melguizo and Strober (2007) also analyze a large data set, and did not find that books have a significantly positive impact on faculty salary determination for any of the fields studied (Science, Engineering, Professional, Social Sciences, Education, Humanities and Arts). Yet, articles in refereed journals did return a significant positive impact (with the exception of Humanities and Arts).

First, we count by speaker the number of books that were listed on the Library of Congress of the United States,[22] including books that are published or translated into languages other than English. Books are an alternative to journal articles and are able to target an audience beyond academia. The number of titles available on the online catalogue of the Library of Congress of the United States has been used in the past as a measure of long-term quality (Ginsburgh 2003).

In addition, to obtain a better proxy for success we measure the external influence of books by using the *New York Times* Best Seller list and various non-fiction book prizes. We obtain two proxies from *Hawes Publications,*[23] which has documented the top 15 best-selling books of the weekly NYT bestseller list in both fiction and non-fiction since 1st January 1950. Our proxies are the number of NYT best-selling books written by the speaker, and the number of weeks these books have stayed on the list.

Moreover, we collect book award data for several major non-fiction book awards,[24] including the Pulitzer Prize and the National Book Award. The following book awards were obtained by at least one speaker from our sample (number of winners in bracket): Lannan Literary Awards (1), Los Angeles Times Book Prize (4), Michael Faraday Prize (2), National Book Critics Circle Award (1), Pulitzer Prize (4), Royal Society Prizes for Science Books (2) and Science Communication Awards (1).

Descriptive analysis

We first take a look at the differences between academics and non-academics (Table 2). While the speaking fees are higher for academics, the external impact is larger for non-academics. However, the difference in external impact is only statistically significant if we exclude the.edu domains from the counts. Academics produce more books and are more frequently engaged in TED talks (all the metrics are statistically significant). They are also acknowledged with awards more frequently while the average number of NYT bestsellers is almost identical. However, books by academics tend to remain on the list for longer.

[22] See http://catalog.loc.gov/.

[23] See http://www.hawes.com/pastlist.htm/. Prior to 11th September 1977, the best-selling list captures the top 10 best-selling books.

[24] The list includes (in alphabetical order): Anisfield-Wolf Book Awards, Boston Globe–Horn Book Award, Dingle Prize, Donald Murray Prize, Financial Times and Goldman Sachs Business Book of the Year Award, Heartland Prize, Innis-Gérin Medal, Jerusalem Prize, Kistler Prize, Lannan Literary Awards, Los Angeles Times Book Prize, Ludwik Fleck Prize, Michael Faraday Prize, National Book Award, National Book Critics Circle Award, Pulitzer Prize, Royal Society Prizes for Science Books, Samuel Johnson Prize, Science Communication Awards, Science in Society Journalism Awards, and the Specsavers National Book Awards.

Table 2 Academics versus non-academics

Proxies	Non-academic speakers				Academic speakers				*t* test
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	
Male	0.72	0.45	0	1	0.77	0.42	0	1	−1.54
Professional age	33.04	13.24	3	71	31.48	12.33	0	64	1.45
log(Google page)	8.07	2.31	0	13.86	7.77	1.97	2.08	13.53	1.64
log(Google page) exclude.edu domain	8.06	2.30	0	13.85	7.65	2.05	1.95	13.52	2.26*
Minimum Speaking Fee	18309	19788	1000	250000	20617	21150	750	200000	−1.79
Number of books on library of congress	6.97	15.22	0	174	9.43	17.11	0	213	−2.30*
TED talk speaker	0.07	0.26	0	1	0.17	0.37	0	1	−3.67***
Number of times invited to TED	0.08	0.31	0	2	0.25	0.73	0	9	−3.46***
Non-fiction book award dummy	0.004	0.06	0	1	0.03	0.18	0	1	−2.48*
NYT best sellers (number of books)	0.18	1.16	0	18	0.17	0.62	0	5	−0.05
NYT best sellers (number of weeks)	1.02	7.05	0	107	1.67	9.46	0	126	−1.17

The symbols *, **, *** represent statistical significance at the 5, 1 and 0.1 % levels, respectively

In Table 3 we present the correlation between these different external influence proxies. As evidenced by the results, the correlation is not very high, indicating that they are measuring different aspects of external influence which justifies the collection and exploration of these different proxies.

Internal influence

Internal indicators such as citations can be seen as way of measuring collegial reputation (Reskin 1977) or whether contributions are broadly relevant to the scientific enterprise (Merton 1973) and in particular to the current research frontier (Diamond 1986). They are increasingly available not only within the academic profession but also to the general community through avenues such as Google Scholar. To derive the internal influence metrics we rely on Publish or Perish 4,[25] a software program that retrieves raw citations using Google Scholar or Microsoft Academic Search and analyzes those citations using a broad set of measures. As Google Scholar offers better coverage (also for a cross-disciplinary comparison), we will only work with Google Scholar data. Another advantage of Google Scholar is that it covers the newer material better (Bauer and Bakkalbasi 2005) as well as material beyond peer-reviewed journal contributions (Levine-Clark et al. 2008) that could be relevant in measuring the internal impact of scholars (e.g., working papers). Bar-Ilan (2010) concludes that “Google Scholar’s coverage was surprisingly good, and its accuracy was also better than expected” (p. 506).

[25] See http://www.harzing.com/pop.htm/ and Harzing (2010).

Table 3 Correlation matrix of external influence proxies

Correlation	log(Google p.)	log(Google p. w/o.edu)	# Of books on LoC	TED talk	TED talk (times)	Book prize	NYTBS (# books)	NYTBS (# weeks)
log(Google p.)	1							
log(Google p. w/o edu)	**0.999*** **	1						
# Of books on LoC	0.333***	0.329***	1					
TED talk	0.172***	0.169***	-0.024	1				
TED talk (times)	0.180***	0.178***	-0.032	**0.770*** **	1			
Book prize	0.104*	0.104*	0.234***	0.061	0.106*	1		
NYTBS (# books)	0.218***	0.217***	**0.425*** **	0.058	0.056	0.081*	1	
NYTBS (# weeks)	0.170***	0.169***	0.310***	0.123**	0.127**	0.125**	**0.746*** **	1

Correlations over 0.4 are in bold. The symbols *, **, *** represent statistical significance at the 5, 1 and 0.1 % levels

We will focus on the following metrics: number of papers, total citations, average number of citations per paper, h-index, and hIa-index. The total number of papers is a quantitative measure that takes into account productivity but not the importance or impact of the papers (Hirsch 2005). On the other hand, the h-index provides a measure described by Hirsch (2005) as "an estimate of the importance, significance, and broad impact of a scientist's cumulative research contributions" (p. 16572). It therefore incorporates both quantity and visibility of contributions (Bornmann and Daniel 2007). However, the h-index has been criticized for being insensitive to outstandingly highly cited papers (Egghe 2006) and punishes newcomers who have both a low publication output and number of citations (Glänzel 2006).[26] Thus, we also explore the average number of citations per paper, allowing a comparison between scientists of different ages (Hirsch 2005). Harzing et al. (2014) are also critical of the problems with the h-index when comparing academics working in different disciplines, due to dissimilar publication and citation backgrounds. They develop a new metric, termed hIa-index, that allows for a more reliable comparison between academics in different disciplines and at different career stages. The authors correct for a considerable part of the variation across disciplines by using the number of co-authors[27] and to correct for differences in career length they take into account the numbers of years an academic has been publishing. To be more precise, they first normalize citations for each paper by dividing the number of citations by the number of authors for that paper. Next, they calculate the h-index which is now based on normalized citation counts. Finally, they divide this value by the number of years that an academic has been publishing. Harzing et al. (2014, p. 818) recommend to use this index in conjunction with the h-index and the total number of citations. We will also report the total number of citations which has the advantage of measuring the total impact (Hirsch 2005). However, such a measure could be driven by a small number of outstanding contributions (Hirsch 2005).

Referring to also other studies, Bar-Ilan (2010) states: "currently, there is no single citation database that can replace all the others" (p. 505). Thus, as a robustness test, we record the total number of publications and citations, and the average citations received (without self-citation) from *Scopus*. The correlation matrix of the variables reported in Table 6 indicate that, the correlation between the different citation metrics is in general not that high which shows that we are measuring different aspects of internal impact.

We decided to use *Scopus* instead of *Web of Science* as *Scopus* uses a valuable author identifier. The database employs an algorithm that matches authors based on several characteristics such as affiliation, address, subject area source title, dates of publication citations, and co-authors (Li et al. 2010). With more than 23,674[28] journals (around 6600 more journals that the *Web of Science*[29] databases), *Scopus* offers a greater breadth of coverage than *Web of Science* (Levine-Clark et al. 2008). In addition, *Scopus* has a very user friendly interface (Li et al. 2010).

Employing a set of different indicators takes into account the fact that scientists have different career paths and comparative advantages. Dixit (1994, p. 12) has nicely pointed this out: "Some people are good sprinters in research. They can very quickly spot and make a neat point; they do this frequently, and in many different areas and issues… In the same metaphor, others are middle-distance runners… A few… are marathoners; they run

[26] See Glänzel (2006) for a further discussion of shortcomings of the h-index.

[27] Publish or Perish limits the maximum number of authors considered to 50 (Harzing et al. 2014).

[28] See http://www.elsevier.com/online-tools/scopus/content-overview

[29] http://wokinfo.com/citationconnection/ and http://ip-science.thomsonreuters.com/cgi-bin/jrnlst/jlresults.cgi?PC=MASTER .

only a small number of races, but those are epics, and they get the most (and fully deserved) awe and respect. In contrast, the profession seems to undervalue sprinters. But each kind of work has its own value, and the different types are complements in the overall scheme of things. Progress of the subject as a whole is a relay race, where different stretches are of different lengths and are optimally run by different people". Hirsch (2005, p. 16571) also points out that "a single number can never give more than a rough approximation to an individual's multifaceted profiles, and many other factors should be considered in combination in evaluating an individual".

Estimation results

The relationship between *external prominence* and minimum speakers' fees is plotted in Fig. 3. The nonlinear structure of web index entries is taken into account by showing the results in log(indexed web pages) by Google on the left-hand side and log(indexed web pages excluding.edu) on the right-hand side. The figure demonstrates a positive relationship with a correlation of 0.365 (Pearson's r) left and 0.363 right suggesting that external prominence may impact the ability to obtain high rents on the market for speaking fees. Figure 4 in the Appendix depicts the results with sub-samples. Speakers with a part-time or no academic involvement have a higher correlations ($r = 0.414$ and $r = 0.422$ for non-academics and part-time academics, respectively) compared with full-time academics ($r = 0.309$). Therefore, it seems that at least in monetary terms, nonacademic speakers are better able to capitalize on their external prominence.

Table 4 reports the results of eight OLS regressions. In each specification, we control for academic involvement, gender, professional age, and field. Professional age is approximated by the career length of the speakers (year since their highest education). In addition, we create a dummy variable to identify speakers who have earned a doctorate degree (e.g. Ph.D., DBA, J.D. or M.D. etc.). We also control for gender differences. Gender differences in salary differentials in the academic labor market have been an important topic in the literature. For example, Barbezat (1987, 1991) observes that salary discrimination has fallen since 1968. In addition, we have also controlled for the location of the speaker (42 speakers are located outside North America: 8 in Asia and 34 in Europe) and whether the speaker has won the Nobel Prize. The Nobel Laureates in our data set are Jimmy Carter (Peace); Steven Chu (Physics); and Robert Mundell, Myron S. Scholes, Daniel Kahneman, Amartya Sen and Robert W. Fogel (all in Economics).

With respect to our key variables, the indexed web pages report a strong influence on speaking fees. The coefficient is highly statistically significant and speaking fee elasticity suggests that a 1 % increase in indexed web pages increases minimum speaking fees by 0.161 % in specification (1) and 0.159 % in specification (2). In specification (2) we subtracted the number of web pages in education domains (URL which contains the domain.edu) from the total Google page count to provide a more accurate measure of external impact, since pages in education domains refer to internal academic activities. Next, we analyze the effect of books. The coefficient of the number of books listed in the Library of Congress is also positive and significant at the 1 % level. Writing a book increases the speaking fees by 0.06 %, so therefore the effect is not very large. However, if a book became a NYT best seller, the effect is substantially larger (15.7 %). In addition, the number of weeks on the NYT list also contributed to the market value of a speaker. The effect, ceteris paribus, of each additional week is 1.2 %. TED appearances are also correlated with higher speaking fees. The dummy variable for having given a TED talk and

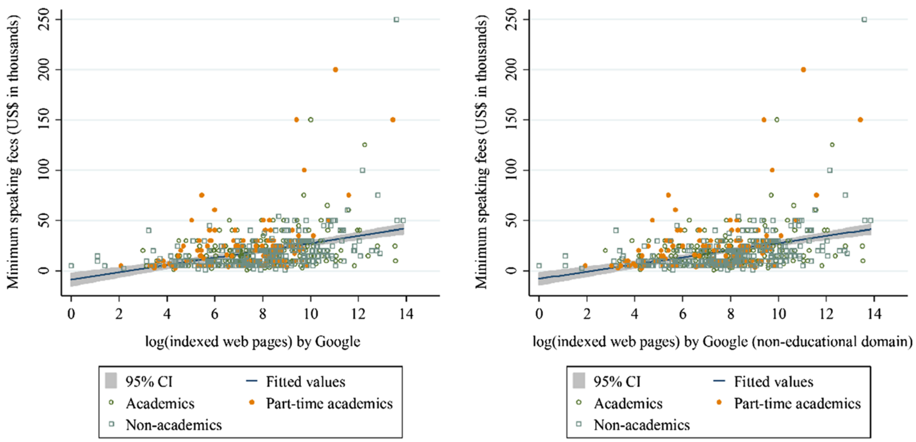

Fig. 3 External prominence and minimum speaking fee

the number of invitations are highly statistically significant. Those who have spoken at a TED gathering have on average (when holding other factors fixed) substantially higher speaking fees (26 percent). On the other hand, authoring a non-fiction award-winning book does not increase the minimum speaking fee at a statistically significant level.

Looking at the control variables we find the tendency for academic speakers ceteris paribus to charge a higher speaking fee relative to their nonacademic counterparts with similar external influence. Part-time academics reap the strongest benefit, reporting a coefficient that is always statistically significant. All else being equal, they generate between 20.4 and 32.8 percent higher speaking fees than non-academics. We also observe differences across fields. Social science speakers in the business area have a significantly higher market value than natural science speakers (around 30 %) while the difference between other social sciences and natural science is not statistically significant. Interestingly, there are no gender differences, however seniority matters. An increase in professional experience by 10 years increases the minimum speaking fees by around 10 %. There is also a positive correlation between being a Nobel laureate and speaking fees, although the coefficient is not statistically significant. Interestingly, North American speakers report lower speaking fees. However, when we control for Google impact or TED appearance, the coefficient loses its statistical significance.

Moreover, by repeating the analysis in Table 4 but restricting the sample to study only non-academic speakers, we find that the effect of log(Google page), number of books and NYT Best Sellers remain significantly positive, but book prize and TED talk (both dummy and number of invitations) are not significant. The positive effects of career age and business discipline also remain statistically significant at 1 % (results not shown). In addition, we investigated whether a PhD is correlated with higher speaking fees and discovered this was not the case. In fact, we actually observe the opposite effect. There is a negative relationship between having a PhD and size of the speaking fees.

In addition, we explore the interaction term between dummies for academic engagement and external impact (log(Google page) with and without exclusion of.edu). The interaction effects are not statistically significant indicating that academics are not more able to profit from their external impact than non-academics.

Table 4 Speaking fee and external influence

	Dep. var.: log(min. speaking fee)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Academics								
Part-time	0.326 (4.06)***	0.339 (4.21)***	0.210 (2.42)*	0.216 (2.48)*	0.204 (2.35)*	0.214 (2.46)*	0.213 (2.47)*	0.214 (2.47)*
Full-time	0.135 (1.91)	0.156 (2.20)*	0.102 (1.30)	0.098 (1.25)	0.089 (1.14)	0.117 (1.50)	0.138 (1.80)*	0.118 (1.53)
Background								
Male	0.007 (0.09)	0.012 (0.16)	0.063 (0.80)	0.061 (0.77)	0.049 (0.62)	0.066 (0.83)	0.069 (0.88)	0.071 (0.90)
Professional age	0.006 (2.89)**	0.007 (2.96)**	0.008 (3.02)**	0.010 (4.10)***	0.010 (4.15)***	0.009 (3.81)***	0.009 (3.63)***	0.009 (3.72)***
Nobel Prize Laureate	0.363 (1.18)	0.357 (1.16)	0.358 (1.04)	0.529 (1.58)	0.537 (1.61)	0.505 (1.50)	0.089 (0.25)	0.315 (0.92)
North American based	−0.106 (−0.89)	−0.100 (−0.84)	−0.249 (−1.93)	−0.206 (−1.58)	−0.149 (−1.13)	−0.247 (−1.91)	−0.263 (−2.06)*	−0.255 (−1.99)*
Fields								
Social science (business)	0.278 (3.77)***	0.278 (3.77)***	0.272 (3.38)***	0.311 (3.76)***	0.330 (4.04)***	0.284 (3.50)***	0.291 (3.65)***	0.281 (3.50)***
Social science (others)	−0.082 (−0.96)	−0.087 (−1.02)	−0.002 (−0.02)	0.042 (0.45)	0.050 (0.54)	0.026 (0.28)	−0.011 (−0.12)	0.003 (0.03)
Proxies								
log(Google page)	0.158 (10.77)***							
log(Google page) excluding.edu		0.156 (10.72***)						
Number of books on Library of Congress			0.005 (2.37)*					

Table 4 continued

	Dep. var.: log(min. speaking fee)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TED talk speaker				0.227 (2.11)*				
Number of times invited to TED					0.202 (3.46)***			
Non-fiction book award dummy						0.320 (1.28)		
NYT best sellers (number of books)							0.155 (4.05)***	
NYT best sellers (number of weeks)								0.012 (3.01)**
N	580	580	580	580	580	580	580	580
Prob. > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.237	0.236	0.091	0.089	0.101	0.085	0.108	0.097

The symbols *, **, *** represent statistical significance at the 5, 1 and 0.1 % levels, respectively; t statistics in parentheses. The reference group for full-time and part-time academics is non-academics. The reference group for social science (business) and social science (others) is natural science

Next, we analyze the *academic performance* as captured by *Publish or Perish* (version 4) and *Scopus* data on publications and citations. Thus, we restrict our sample to include only those speakers in academia ($N = 314$). We perform a single regression on each performance measure, controlling for academic involvement, gender, career age, academic field, Nobel Prize and location. We construct two sets of regressions, with and without controls for log(non-education Google pages). Hence, Table 5 summarizes the results of two sets of 14 OLS regressions. Most of the publication and citation metrics are able to explain the variation in speaking fees. All coefficients are significantly positive for *Google Scholar*, indicating that scholars with higher internal impact could capitalize their internal success via speaking fees. On the other hand, when using *Scopus,* only the average citation count is statistically significant. Thus, there is a trend in the results indicating that internal impact matters. However, when we control for log(non-education Google pages) as a key proxy for external influence, the internal impact largely disappears. It remains only for the average number of citations per paper. Furthermore, when analyzing the data from Scopus, the coefficient for citations per publication is no longer statistically significant ($t = 1.57$). One reason could be the accessibility of the data. Google Scholar has a definite advantage in that it is not a commercial-based citation source such as Scopus and is therefore available to anyone. This could be an important point when looking at speaking fees. In addition, the results obtained for citations per publication could indicate that quality matters more than quantity, or a mix of quantity and quality. On the other hand, Google pages are always highly statistically significant. Next, we calculate the standardized/beta coefficients to explore the relative strength of external and internal success. The results indicate that the effect of Google pages is twice (Google Scholar) as strong as for citations per paper. This demonstrates that external impact is substantially more important than internal impact for speaking fees.

Table 5 also reports the influence of other external impact proxies on speaking fees among academics. The results are consistent with Table 4 with the exception of the number of books listed in the Library of Congress (no longer statistically significant). TED appearances are significantly correlated with higher speaking fees as are NYT Best Selling books. All four proxies remain statistically significant once we control for external influence via Google. Calculating the standardized/beta coefficients indicates the strongest effect for Google pages: for example, three times stronger than having done a TED talk and twice as strong as the number of NYT Best Sellers books.

Discussion and conclusions

The results of our study indicate that scholars can capitalize on their external prominence in the speakers' market. The larger the number of web pages that index a particular academic, the higher the minimum speaking fee he or she attracts. Similarly, having been invited to speak at a TED event is positively correlated with speaking fees. In contrast, research performance in terms of publications and citations does not increase speaking fees above and beyond our Internet measure of external prominence. There is a clear distinction between the capitalization of external and internal prominence.

Research evaluations have become a crucial part in the business of science and technology management (Klavans and Boyack 2008) and we observe a phenomenon Johan Bollen describes as a "Cambrian explosion of metrics" (Van Noorden 2010, p. 864). Broader impact criteria may emerge in the future to evaluate the performance of scientists. In particular, criteria that measure a scientist's social effect could become more important

Table 5 Academic performance and speaking fees

Dep. var.: log(min. speaking fee)	(9–22)		(23–36)		Log(non educational domain Google pages)	
	Coeff.	*t*-stat.	Coeff.	*t*-stat.	Coeff.	*t*-stat.
Publish or perish						
Google scholar						
Number of papers	7.4e−04**	(3.25)	−1.4e−04	(−0.54)	0.153***	(5.77)
Number of citations	5.2e−06**	(2.77)	3.2e−07	(0.17)	0.143***	(6.01)
Average number of citations per paper	3.7e−03***	(3.98)	2.8e−03**	(3.12)	0.134***	(6.17)
h-index	7.1e−03***	(3.91)	1.5e−03	(0.75)	0.135***	(5.35)
hI, annual	0.445***	(4.17)	0.18	(1.58)	0.128***	(5.34)
Scopus						
Total publication count	8.0e−04	(1.58)	4.8e−04	(1.01)	0.143***	(6.56)
Total citation count	8.8e−06	(1.56)	4.8e−06	(0.89)	0.143***	(6.54)
Average citation count per publication	3.2e−03*	(2.59)	1.8e−03	(1.57)	0.142***	(6.15)
Books						
Number of books on library of congress	2.5e−03	(0.86)	−3.1e−03	(−1.10)	0.152***	(6.72)
Non-fiction book award dummy	0.344	(1.26)	0.189	(0.74)	0.143***	(6.59)
NYT best sellers (number of books)	0.32***	(4.62)	0.226***	(3.34)	0.128***	(5.82)
NYT best sellers (number of weeks)	0.011*	(2.49)	7.3e−03	(1.69)	0.14***	(6.40)
TED						
TED dummy variable	0.372**	(2.83)	0.234	(1.86)	0.138***	(6.29)
TED number of invitations	0.242***	(3.74)	0.159*	(2.53)	0.133***	(6.04)

Summary of 28 regressions. *N* of academics = 314. The symbols *, **, *** represent statistical significance at the 5, 1 and 0.1 % levels, respectively. The control variables (academic involvement, gender, career age, academic field, Nobel Prize and location) were included in the regression but not reported in the table. The first set of regressions (1) does not control for log(non-education web pages) (column 1 and 2) and while (2) does (column 3 and 4). Column 5 and 6 report the coefficient and *t*-statistics of log(non-educational domain Google pages) as, for example, government agencies that support fundamental research and education are putting more emphasis on it. The Internet offers significant potential in the measurement of scholarly impact beyond academia. Some methods may be perceived as "quick-and-dirty", but an overload of information heightens incentives for decision makers to use such instruments that are fast and easily available. In addition, a large set of available tools may increase the incentive of administrators or evaluators to "play an academic version of *Moneyball*[30]" (Priem 2013). On the other hand, as Priem (2013) points out, the Web eliminates the artificial distinction between process and product, providing new ways of mapping scholarly contribution: "Suddenly, the rocky plain of ideas once navigated using cairns of citation—is covered in fresh snow. In the Web era, scholarship leaves footprints" (p. 438). Thus, a deeper discussion and exploration of available proxies would be beneficial for academics and beyond.

Future research could look more closely at how the organizational context affects scientists' external influence. A better understanding of all the different reward structures in academia is crucial, as scientific work and productivity could depend on it. It has been suggested that scientists respond to the achievement of recognition (Merton 1973). For example, Nederhof (2008) reports results from a natural experiment in the Netherlands where a grassroots ranking (Top 40) led scientists to publish more in these top forty journals. However, such publication stimulus was not connected to an optimization of citation performance.

The willingness to pay for listening to scientists present their research may be taken to reflect the relevance of the science for practical issues. Observing that scholars of more renown in the general public are better paid in the speakers' market might not strike the reader as surprising. Moving beyond this confirmatory insight, our paper focused on the difference between academic and nonacademic speakers as well as differences between fields. Social scientists in the area of business generate the largest speaking fees compared to other social scientists or natural scientists. In addition, part-time scientists are also more successful. The finding that academic speakers can monetize their knowledge to a larger extent than nonacademic speakers may suggest that there is a considerable link between scholarly research and practical relevance. However, this only holds if speaking fees comprehensively capture the public interest in science. These considerations point out the need to further inquire into the relationship between academic research and practice. The Nobel laureate Rowland (1993) stated in his presidential address to the American Association for the Advancement of Science: "From my own experience, I see that the most serious problems are related to faulty communication about science among the various segments of society, including the scientific segment itself. Each of us is bombarded daily by messages from television, radio, magazines, newspapers, and so on. We live in the midst of massive information flow, but those items connected with science itself are often badly garbled, sometimes with potentially serious negative consequences. The remedy must lie in greater emphasis by all of us increasing both the base level of knowledge of science and communication about science with all levels of society" (p. 1571).

Acknowledgments For advice and suggestions thanks are due to two anonymous referees.

Appendix

See Fig. 4 and Table 6.

[30] http://en.wikipedia.org/wiki/Moneyball_(film).

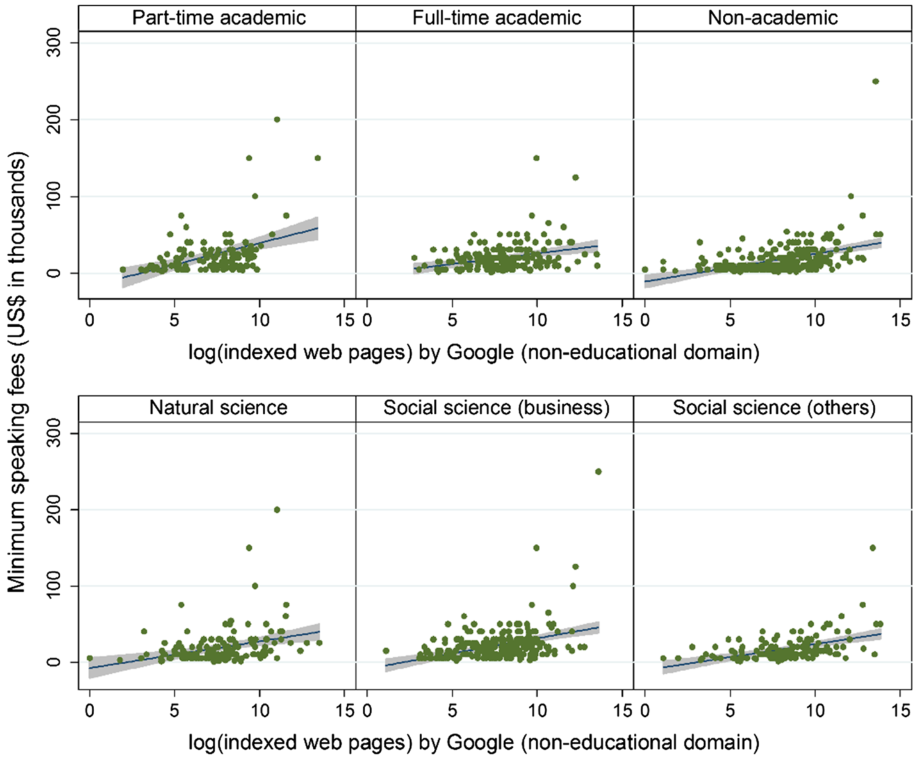

Fig. 4 Speaking fees and external impact in sub-fields

Table 6 Correlation matrix of internal impact proxies (Google Scholar and Scopus)

	Google Scholar					Scopus		
	Total papers	Total cit.	Avg. cit.	h-index	hIa-index	Total pub.	Total cit.	Avg. cit.
Google Scholar								
Total papers	1							
Total cit.	0.77	1						
Avg. cit.	0.36	0.64	1					
h-index	0.88	0.83	0.55	1				
hIa-index	0.58	0.58	0.49	0.75	1			
Scopus								
Total pub.	0.46	0.37	0.22	0.61	0.50	1		
Total cit.	0.39	0.48	0.33	0.59	0.47	0.82	1	
Avg. cit.	0.36	0.57	0.58	0.53	0.41	0.23	0.45	1

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