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External Influence as an Indicator of Scholarly Importance

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Abstract

Although the external influence of scholars has usually been approximated by publication and citation count, the array of scholarly activities is far more extensive. Today, new technologies, in particular Internet search engines, allow more accurate measurement of scholars' influence on societal discourse. Hence, in this article, we analyse the relation between the internal and external influence of 723 top economists using the number of pages indexed by Google and Bing as a measure of external influence. We not only identify a small association between these scholars' internal and external influence but also a correlation between internal influence, as captured by receipt of such major academic awards as the Nobel Prize and John Bates Clark Medal, and the external prominence of the top 100 researchers (JEL Code: A11, A13, Z18).

Key words: academia, scholarly importance, role of economics, external and internal influence, academic performance

1. Introduction

The primary metric currently used to approximate individual scholars' influence is the number of publications and, perhaps more appropriately, the number of citations in academic journals. This approach also dominates the rankings of both individual researchers and departments and universities. Yet the scholarly activity this metric captures is only narrowly defined and its impact concentrated 'within' academia. For example, collections of general academic publications and citations cover a restricted set of publication outlets (excluding

books, pamphlets, reports, and newspapers). Likewise, appointment as a university researcher often depends only on the number of publications in 'top-tier' academic journals.

Meanwhile, it is generally acknowledged that a scholar's responsibilities and functions span a far broader array of activities, which can be categorized under four rubrics: (1) scholarly publication including activities as referee, editor, or board member, (2) teaching, (3) academic self-governance (for example, serving as department head or dean), and (4) influence on the broader society. Whereas two of these four activity types—scholarly publication and academic self-governance—are 'internal' to the university community, influence on the broader society is 'external'. Teaching is a mix of the two: although an internal activity, it has an external impact via the influence exerted by students after graduation.

In fact, many scholarly institutions have an explicitly stated goal of participating in the wider societal discourse, although this goal differs between disciplines and subdisciplines. For instance, although the general public does not usually expect theoretical physicists to directly impact society, it does expect applied physicists to make a contribution. To economists, the public even ascribes the ability to predict the future course of the economy, which explains the current backlash against the economics profession and its inability to predict the latest financial and economic crisis.

Moreover, although it is crucial to understand how internal activities within academia relate to the outside world, particularly to the economy (Frey, 2006), views on this matter diverge strongly. For example, Clower (1993, p. 23), a former editor of the *American Economic Review* (*AER*), claims that '[m]uch of economics is so far removed from anything that remotely resembles the real world that it is often difficult for economists to take their subject seriously'. Blaug (1997, p. 3) advances a more devastating verdict: 'Modern economics is sick; economics has increasingly become an intellectual game played for its own sake and not for its practical consequences'. Even Nobel Prize recipients in economics, such as Leontief (1971), Coase (1994), and Buchanan (2000) have criticized their field for its lack of involvement in real-life issues. Others, although still convinced that economists do have an effect on society, doubt that this influence is beneficial (for example, Galbraith 1975). Long before the latest travails, Friedman (1972, p. 12) admonished, 'we economists in recent years have done vast harm—to society at large and to our profession in particular—by claiming more than we can deliver'. As evidenced by press coverage in eminent economics magazines (for example, The Economist 1997, 2000), these negative perceptions are also shared outside of academia.

In contrast to this pessimistic view, other economists tend to embrace Keynes' (1936) famous claim that 'the ideas of economists and political philosophers [. . .] are more powerful than is commonly understood. Indeed the world is ruled by little else' (p. 383). Even his intellectual opponent Hayek (1991) posited that 'economists have this great influence only in the long run and indirectly' (p. 37). More recently, similar views of economics' considerable impact on society have been put forward by Dasgupta (1998), Baumol (2000), and Summers (2000), among others. Baumol (2000), for instance, claims that '[in economics], the century has been full of accomplishments. New ideas, new directions, and powerful new tools have emerged in the profession. Evidently, our field of study is alive and well' (p. 38).

It is difficult, perhaps impossible, to empirically analyse the extent to which these strongly contrasting views on the societal influence of the economics profession apply, not least because there exists no single 'economic view' that could be acted upon (Frey 2006). Indeed, economists even struggle to find a consensus about what constitutes 'economics'

(see Brittan 1973; Kearl et al. 1979; Samuels 1980; Frey et al. 1984; Alston et al. 1992; van Dalen and Klamer 1997; Machin and Oswald 1999). The positions upon which they do agree, however, are viewed with scepticism by the wider public. For example, a recent study by Sapienza and Zingales (2013) identifies a considerable gap (of 35 percentage points) between the answers to policy questions given by economists versus average Americans. Interestingly, this gap is largest for questions on which economists agree the most and on which there is the most literature.

Identifying a unidirectional impact of economics on society is further complicated by reverse causation by which society determines the subject matter of economics. The impact of economists is also driven by the demand side. Academic economists, as well as those working for central banks and other financial institutions, can be asked for their advice in the form of commissioned reports and official statements (a practice sometimes criticized as a way of legitimizing already decided policies). We therefore approach the issue of social influence by examining the 'relation between academic economists' internal and external influences'; specifically, the extent to which the importance ascribed to economists 'within' academia (based on publication and citation count[1]) is reflected in their 'external' influence, as proxied by mentions on Internet search engines (particularly Google and Bing).

The remainder of the article is arranged as follows. Section 2 puts our approach into perspective, summarizing the various ways in which a scholar's external influence may be captured. Section 3 describes our measure for external influence, which is based on the number of pages indexed on Google and Bing. Section 4 then reports our results, and Section 5 concludes the article.

2. Capturing the external influence of economics and economists

To our knowledge, there are no systematic empirical studies comparing academic economists' internal and external rankings except for one study that measures the external influence of management scholars in the USA (Aguinis et al. 2012). These authors find that a scholar's standing within the community of management scholars (as measured by citations in academic publications) deviates significantly and often to a high degree from the attention received outside academia (as measured by web pages on Google). It is therefore unwarranted to assume that a researcher well-known in academia is also recognized outside academia and vice versa: some management scholars prominent outside academia (among them best-selling authors) are rarely if ever cited in academic publications.

Moreover, despite a wealth of literature on the possibilities and pitfalls of measuring research quantity and quality based on publications and citations (for example, Cole and Cole 1971; Lindsey 1980; van Dalen and Klamer 2005; Coupé et al. 2010; Arrow et al. 2011; Johnston et al. 2013; Torgler and Piatti 2013), there is little research addressing the public attention received by economics and economists, probably because such attention is difficult to identify and measure. Related discussions are largely descriptive rather than empirical, a problem that we attempt to remedy by distinguishing three different categories of processes that reflect the public influence of economists and economics.

1 One problem with this measure is that some methods/theories become standard so authors outside this paradigm are no longer cited. We are thankful to one of the referees for mentioning this point.

2.1 Reflections of the influence via markets

2.1.1 Patents and copyrights

In some disciplines, mostly the natural sciences, a scholar's contributions to society are at least partly captured by the number of patents received and the income they produce. However, despite a great deal of literature on this measure's adequacy and the many pitfalls involved (for example, Trajtenberg 1990; Hall et al. 2001), the fact that patents play practically no role in economics eliminates them as a possible measure of outside impact for that discipline. For economics, copyrights are more relevant because they refer to both books and articles in scientific journals and other outlets. Yet to our knowledge, no consistent data exist on this topic. Moreover, copyrights may be considered more as an aid to producing and propagating economic ideas rather than as an indicator of the extent of influence wielded. Writing a bestseller and receiving a high copyright income does not necessarily mean that the respective economist's ideas have great influence.

2.1.2 Speaking fees

Although scholars well-known to the public may demand higher monetary compensation for giving talks outside academia (Chan et al. 2014b), such activity, albeit potentially influential, may serve primarily as entertainment for a select and private group (for example, at company events), with little wider social impact. In addition, systematic data on such remuneration across countries is limited (Hosp and Schweinsberg 2006).

2.1.3 Advisory activities

One potentially useful indicator of economists' importance is the positions attained and income received by individuals appointed to expert panels. These positions range from membership of a high-level economic advisory board (for example, the Council of Economic Advisors in the USA or the Sachverständigenrat in Germany) to assuming advisory roles in ministries, non-governmental organizations, and companies. Yet, even though comprehensive statistics on such activities may exist for certain areas, and perhaps even countries, there is no database that would allow us to draw meaningful international comparisons.

2.2 Reflections of the influence via persons

2.2.1 Former students in the private and not-for-profit sectors

Economic knowledge may be transferred to the public by former students who have become active outside academia; for instance, as managers in private firms, as members of interest groups, or as participants in the voluntary sector. This type of influence is difficult to capture because the underlying economic ideas are not necessarily expressed explicitly but rather may have been integrated into the alumni's thinking and actions. Hence, although students may inculcate the economic ideas and further propagate them, this influence is difficult or even impossible to capture statistically. Admittedly, business school evaluations do try to capture alumni's potential influence by measuring their subsequent income, yet usually only the starting salary is taken as an indicator of the value added to a person's educational capital. Obviously, this measure is incomplete and biased, particularly given the significant differences in 'average' salaries across different economic sectors.

For instance, the salary of a graduate working in the financial sector tends to be much higher than that of a comparable graduate working in the non-profit sector. In an effort to develop a more useful ranking matrix, *Research Papers in Economics (RePEc*, see http://repec.org) has recently introduced the publication *Genealogy*, which allows individuals to provide information about their students and supervisors with the aim of assessing dissertation advisor and doctoral program quality. A recent poll by RePEc indicates that 54% of respondents are in favour of such a ranking (RePEc 2013a).

2.2.2 Politicians and public officials

When we limit our attention to economics professors during recent years, we can identify several economists who have achieved high ranks in politics and public administration. In the Netherlands, for example, Lubbers, Zijlstra, and De Quay were all prime ministers; Andriessen, Duisenberg, Witteveen, and Zahn were ministers of finance; and Pronk and Ritzen served as ministers in other departments. In Germany, Erhard was Chancellor; Schiller was finance minister, and Töpfer and Hankel were heads of other ministries. In Italy, Prodi and Monti were both Prime Minister and Einaudi was President of the Republic. In many countries, the position of the president of the central bank is normally occupied by a former professor of economics. We are, however, unaware of any reliable and encompassing data on such positions.

2.3 Reflections of the influence via outside markets

2.3.1 References in official documents

Official documents offer two potentially effective measures of the extent to which researchers' contributions have actual policy implications: the first is the citation count in publications released by public bureaucracies; the second is the citation count in commissioned reports and similar materials.

2.3.2 Surveys

A scholar's importance outside academia may also be captured by surveying the general public (for example, in popular journals) or specific groups, such as public bureaucracies, special interest groups, and not-for-profit institutions.

2.3.3 Awards

Scholars may also receive orders, medals, crosses, prizes, and other awards from institutions outside academia, as typified by the British Queen's appointment of scientists to the House of Lords. Because such honours signal the importance and quality of the recipient's work (Frey and Gallus 2014), we examine the relation between external influence and such key awards in economics by analysing data on the Nobel Prize, the John Bates Clark Medal, and various fellowships (Fellow of the Econometric Society, the American Economic Association, or the European Economic Association; see also Chan et al. 2014a).

2.3.4 Publications and citations in the popular media

Members of academia may actively influence society by writing in newspapers or other press venues accessed by the public, including appearances on radio and television. Scholars

may also passively influence the wider public via these channels if the topic's societal interest causes journalists to report on it.

2.3.5 New media

Scholarly activity by economists is also reflected via new media channels, including digitized books and newspaper articles, published mostly online, that are either written by scholars or cite their findings. Beyond these traditional publication outlets on the Internet, influence may also be exerted via Twitter, online portals on which economists present brief but socially relevant economic analyses (for example, VoxEU), and economists' blogs (for example, 'Marginal Revolution'), which are sometimes written in collaboration with non-academics (for example, 'Freakonomics'). According to the *Wall Street Journal*, the most popular of these blogs can attract as many as 50,000–100,000 page views a day (Evans 2009). These new media, more than any other platform, are interactive and largely unregulated, meaning that persons from outside academia may engage in or launch discussions with economists. Users may thus multiply the reach of economic ideas by sharing and citing them within their social networks, for instance, on Twitter and Facebook or on their own blogs. Interestingly, according to the RePEc poll, 73% of respondents argued against counting Wikipedia mentions as citations for ranking purposes, and 84% were against doing so for blogs (RePEc 2013b).

3. Methodological approach

We gauge economists' influence outside academia by using web page counts from the widely used search engine Google (comScore 2014), focusing on pages outside the '.edu' domain (see also Aguinis et al. 2012).[2] These counts reflect how much attention has been paid to a particular economist online; for example, on mainstream media sites, blogs, and social media. To ascertain the reliability of these counts, we also employ counts from the Microsoft search engine Bing. These are of course not the only possible measures of scholars' societal impact; they do, however, go much further than the citation and publication count measure usually used to assess scholarly influence. Nevertheless, although our measures approximate influence outside of academia, like citation counts, they fail to capture why the author was mentioned (for example, in criticism or praise of his/her work). Citations may be increased, for instance, by negligible mentions in footnotes. Similarly, web page counts may be raised if a scholar has established a dominant online presence (for example, through a blog and Twitter usage), or these counts may reflect media firestorms provoked by the work or an interview given in the press (The Economist 2015). Hence, like the citation count, the web page count is no measure of the quality of an author's work.

Our initial sample of academic economists was drawn from the September 2012 rankings in RePEc/IDEAS, the largest freely available bibliographic database on the Internet dedicated to economics and finance (http://ideas.repec.org). RePEc covers more than 43,000 registered academic researchers who are evaluated monthly on a range of publishing measures (as of February 2015). We use RePEc's average rank score (which takes the harmonic mean of various rankings) to select the top 1000 researchers (http://ideas.repec.org/

2 The sequence .ac is also used in some countries as a second-level domain for academic institutions. At the time of data collection, however, we did not exclude pages from this domain.

top/top.person.all.html), a method that mirrors Aguinis et al.'s (2012) use of current webometric techniques to explore the impact of the top 550 management scholars. By doing so, however, we are exploring relatively successful scholars who are not representative of the entire academic population of economists.

After first conducting searches using quotation marks around author names to avoid spurious matches (and thus incorrect crediting of webpage counts), we controlled for the validity of the sum of each individual's counts by running a single search in two versions of Google (the American google.com and the Swedish google.se). The total number of pages was identical for both versions, a consistency also reported in Aguinis et al.'s (2012) comparison of the American and Spanish versions. Next, to deal with any spurious matches generated by results that were clearly unrelated to the author in question, we employed Aguinis et al.'s (2012) criterion of 5% spurious entries to exclude authors and increase the integrity of the data set by avoiding possible upward bias in the total number of web pages. That is, for all 1000 researchers, we manually checked the first 50 pages, and if three or more pages were not attributed to the author, we excluded this individual from the sample. Finally, to alleviate any concerns about fluctuations in the count totals for Google pages, we ran four separate searches across an 18-day period (19 October to 6 November), with the first collection conducted manually by three research assistants over a 24-hour period on 10 October.

From this initial manual search, we eliminated 274 of the 1000 authors based on the 5% criterion for non-attributed pages. During this manual collection, we also identified discrepancies between the spelling of an author name in RePEc (used purely to define and classify registered authors) and the actual name used in publications, thereby accounting for the fact that many academics publish under more informal or more socially well-known names (for example, 'Mark L. Gertler' in RePEc appears as 'Mark Gertler' on all his published work). In total, we identified 69 names with inconsistencies such as multiple middle names and extra or removed middle initials. Because any Google search for two different names (even for the same author) would result in a different page count, we excluded these cases from our data set, leaving us with a final sample of 723 researchers.

To extrapolate and aggregate the page counts for each individual, we relied on three automated computer searches taken directly from the Google and Bing Search application programming interfaces (APIs), which allow a large number of searches to be run simultaneously in a short amount of time. These three 'automated' searches (run on 31 October, 2 November, and 6 November) not only ensured more robust data capture but also reduced the potential for human error.

Although the number of total search results reported in the manual and automatic counts are only estimates (process not disclosed), the API searches produced a significantly lower estimate than the manual searches. We can only speculate that the results for the manual searches could be slightly inflated as a result of the search engine's extensive index, while the automatic search results reflect an underestimate based on the preliminary search. Hence, whereas the manual search returned a value of 5,410,000 pages for the researcher with the strongest external impact, the API returned only 922,667 pages (over an average of three search processes). Nevertheless, both values are highly correlated.

To avoid limiting the search scope and to further the argument for capturing a wider social impact, we conducted all Google automated searches concurrently on the secondary search engine, Bing. The very high scale reliability coefficients (Cronbach's alpha) for our different count days (Google = 0.9998, Bing = 0.9812) are comparable to those achieved

by Aguinis et al. (2012) and justify computing an average based on the total number of Google or Bing entries across the three automatic data collection waves. The average Google and Bing entries are strongly correlated (Pearson's $r = 0.829$) at a 1% level of significance.

To construct a proxy for the impact 'inside' academia for the 723 economists, we take the individual rankings provided by RePEc based on three baseline measures: total number of citations, total number of articles (and pages), and the h-index (which assigns, for example, a score of 30 when 30 of a scholar's papers have at least 30 citations each but his/her other papers have no more than 30 citations each). To increase the robustness of the analysis, we also include author rankings based on the weighted values of the citations and articles (by number of authors and the journals' simple impact factor, see http://ideas.repec.org/top/). Combining these various measures enables fuller evaluation of different aspects of a scholar's academic performance. For example, the total number of citations for a scholar's works (with self-citations excluded) captures the total attention by peers, while total number of publications provides a measure of productivity. The h-index provides an intuitive measure that takes into account both citation and publication counts.[3] We also explore academic influence by evaluating academic recognition as reflected by the following awards and honours: the John Bates Clark Medal, the Nobel Prize, the Frisch Medal, Fellow of the Econometric Society, Fellow of the European Economic Association, Distinguished Fellow of the American Economic Association, or Foreign Honorary Member of the American Economic Association.

4. Results and discussion

Table A1 reports the 100 most influential economists based on the number of Google pages, together with their RePEc ranking (average rank score) and Bing page values (for comparative purposes). Nobel laureate Milton Friedman, a very active public figure, leads the list; followed by Nouriel Roubini, who was active with the International Monetary Fund, the Federal Reserve, the World Bank and the Bank of Israel; and Nobel laureate Amartya Sen. Also in the top 10 are Nobel laureate Daniel Kahneman, as well as laureate Joseph Stiglitz, who also won the John Bates Clark Medal and served as senior vice president and chief economist of the World Bank and as member and Chairman of the Council of Economic Advisers. In the top 20, we note Alvin Roth, who received the 2012 Nobel Prize in economics.

Several other researchers who combine academic research with policy making are also ranked highly, including Dani Rodrik, who has conducted substantial work on economic policy and government performance, at rank 4; Oliver Blanchard, chief economist at the International Monetary Fund, at rank 8, and Ben Bernanke, chairman of the Federal Reserve, at rank 10. Also on the list at rank 11 is Hans-Werner Sinn, president of the Ifo

3 Other indices derived from the h-index are also possible. One alternative would be Wu's (2010) w-index, which improves on the h-index by placing more focus on the influence of a scholar's top cited papers. The w-index, however, is less able to differentiate between scholars with fewer citations, thereby producing less variation in the rankings than does the h-index. We therefore did not collect data on the w-index for our analysis. Nevertheless, taking the top 2000 RePEc researchers for both indexes, we observe only 19 different ranking positions for the w-index but 46 for the h-index (as of January 2015) (pp. 12–13).

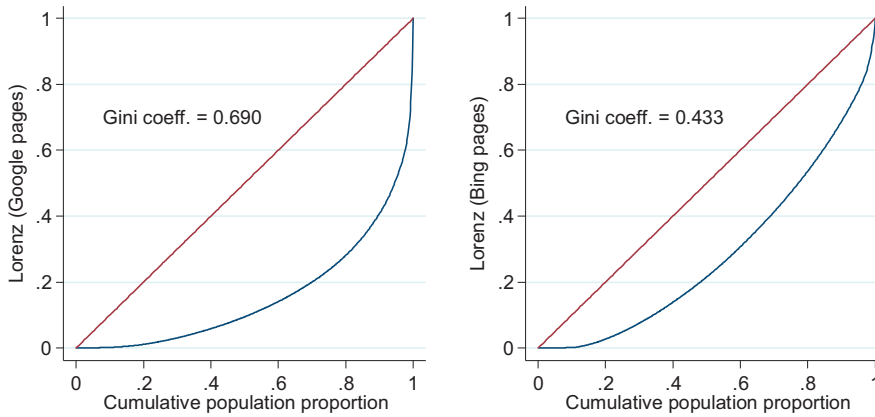

Figure 1. Lorenz curves for Google and Bing page counts.

Institute for Economic Research and since 1989, a member of the Advisory Council of the German Ministry of Economics. Ranked at number 13 is Australian economist John Quiggin, chief research economist with the Bureau of Agricultural Economics, board member of the Climate Change Authority of the Australian Government, and a very active blog writer. The top 20 also includes two other John Bates Clark Medallists (JBCMs), Steven Levitt (at rank 15) and Daron Acemoglu (at rank 17), who are also very successful book authors. Levitt's *Freakonomics* and *SuperFreakonomics*, co-authored with Stephen Dubner, have received wide media and readership attention, leading to a blog, radio show, and movie (see http://www.freakonomics.com/), while Acemoglu's *Economic Origins of Dictatorship and Democracy*, co-authored with James Robinson, accounts for more than 2300 Google Scholar citations (as of 28 July 2013). Ranked at number 18 is Andrei Shleifer, also a JBCM and a key figure in the Russian privatization process, who leads the RePEc ranking. Rounding out the list at number 20 is William Easterly, who has worked for 16 years as a researcher at the World Bank, published widely read books (for example, *The Elusive Quest for Growth*), and maintained a major public debate on foreign aid with his adversary Jeffrey Sachs.

Figure 1 presents two Lorenz curves that illustrate the inequality in the societal influence of individual economists (as measured by Google and Bing counts). In line with Aguinis et al.'s (2012) findings, the figure shows that individual performance follows a power law distribution. A minority of economists draws the majority of web page counts: 20% of those listed are responsible for around 70% of the Google page counts. The Gini coefficient is similarly large (0.690 compared with 0.433) when Google is used instead of Bing.[4] Such highly skewed distributions have been observed in many fields, ranging from biology to social networks (Simon 1955; Barabási and Albert 1999; Barabási 2003). A related concept, the winner-take-all principle (Rosen 1981; Frank and Cook 1995), suggests that minimal differences in individual performance are enough to generate such huge outcome differentials.

4 The Gini coefficient of the number of Google pages (non-.edu domains) in Aguinis et al. (2012) is also 0.688.

Next, we analyse the discrepancy between the rank ordering of economists produced by our measure of societal influence and that produced by the standard RePEc measure. The average rank order difference (ranking of Google page counts minus RePEc average ranking) amounts to 175.5 ranks, which is a considerable change and conforms to the difference of on average 100 ranks found by Aguinis et al. (2012) in their comparison of the lists produced by citation counts and Google entries.[5] The two-sample Kolmogorov–Smirnov test also suggests that the distribution of the rank order difference in our sample is not significantly different to that in Aguinis et al. (2012) (see Figure A1). Figure 2 illustrates the frequency of the different ranking discrepancies that arise when switching between the RePEc and Google (or Bing) measures. In our data set, there is a difference between the Google (Bing) and RePEc listings of over 150 ranks for 47.2% (56.8%) of all scholars. Timothy Besley, for example, is ranked at 67 in RePEc but only at 620 based on Google counts. Similarly, Eugene Fama has an RePEc ranking of 49 but a Google ranking of only 712. Conversely, Simon Kuznets has an RePEc ranking of 678 but a Google ranking of 47, and Reinhard Selten ranks at 585 in RePEc but as high as 75 on Google counts. Likewise, Raj Chetty (who recently received the John Bates Clark Medal) is ranked at 631 on RePEc but at 194 on Google counts. Overall, the histograms in Figure 2 show quite clearly that a scholar's ranking position among fellow economists can differ dramatically based on whether the ranking is based on internal academic evaluations or societal impact. Tellingly, Aguinis et al. (2012) cite an anonymous reviewer in the *Academy of Management Perspectives* who claims that the results obtained 'should give administrators pause' (p. 115).

To further analyse the relation between external impact and other possible measures of internal academic performance, the first two columns in Table 1 present an overview of the correlations between web page counts and a large set of academic performance metrics taken from RePEc for the sample of 723 economists. Here, the correlation measure is Kendall's tau rank correlation (τ) rather than the standard Pearson product-moment correlation (r) because the RePEc rankings are ordinal variables whereas the number of web entries is a continuous variable. Unlike Pearson's r, the Kendall tau rank correlation does not require linear statistical dependence between two variables, only monotonicity. Specifically, it measures the difference between the proportion of the number of concordant pairs (for example, the larger of the two RePEc rankings is associated with the larger of the two Google or Bing rankings) and the number of discordant pairs (for example, the larger RePEc rank order is allied with a smaller Google or Bing ranking) by the total number of pair combinations.

For both Google and Bing, all academic performance ranking metrics are significantly and positively correlated with external influence.[6] Among all internal influence measures, the rankings on 'average rank score' have the highest positive correlation with the number of Google pages (0.277) followed by 'number of citations' (0.254) and 'h-index' (0.252). In comparison, the correlation in Aguinis et al. (2012) between Google entries and the number of citations by management researchers equals 0.237.[7] The Bing metric overall produces a

5 The initial RePEc ranking is reordered for comparison to the rank order by Google and Bing page count so that all three rankings take values from 1 (highest) to 723 (lowest).

6 The level of significance of the Spearman's rank correlation does not differ from the Kendall's tau correlations.

7 Aguinis et al. (2012) report a Pearson's correlation of 0.166 for total number of citations and total number of non-.edu Google pages. To enable comparison, we calculate the Kendall's tau rank correlation using data from Table 4 in Aguinis et al. (2012).

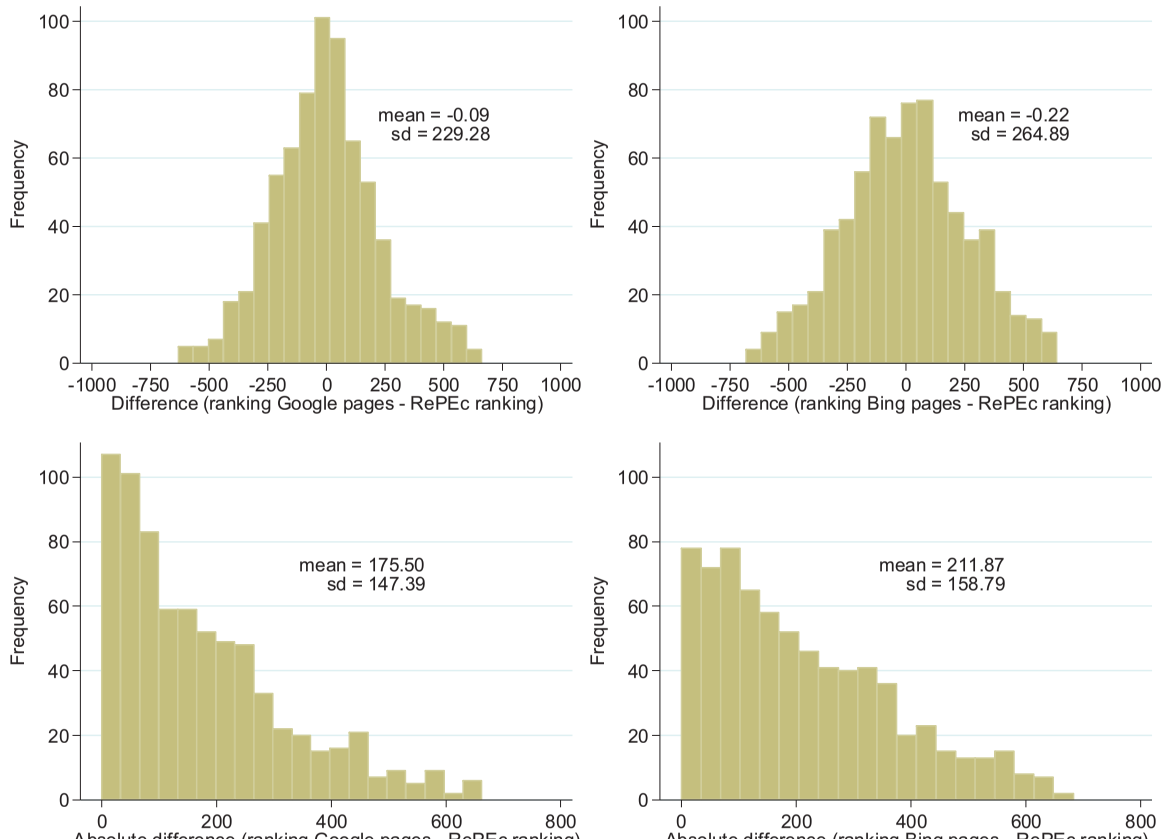

Figure 2. Rank order differences across lists, by either internal or external influence measure.

Table 1. Correlations between external influence and internal performance (RePEc rankings)

RePEc rankings	Average: Google ($N = 723$)	Average: Bing ($N = 723$)	Average: Google (top 100)	Average: Bing (top 100)
Average rank score	0.2771*** (0.0000)	0.1324*** (0.0000)	0.2847*** (0.0000)	0.0752 (0.2692)
Number of distinct works	0.1271*** (0.0000)	0.0972*** (0.0001)	0.0265 (0.6986)	−0.0188 (0.7841)
Number of distinct works weighted by simple impact factor	0.2211*** (0.0000)	0.1074*** (0.0000)	0.1113 (0.1014)	−0.0012 (0.9881)
Number of distinct works weighted by number of authors and simple impact factor	0.2186*** (0.0000)	0.1430*** (0.0000)	0.0879 (0.1962)	0.0230 (0.7365)
Number of journal pages	0.1283*** (0.0000)	0.0774*** (0.0019)	0.0004 (0.9976)	−0.0697 (0.3056)
Number of journal pages weighted by simple impact factor	0.1897*** (0.0000)	0.1050*** (0.0000)	0.1457** (0.0320)	0.0473 (0.4877)
Number of journal pages weighted by number of authors and simple impact factor	0.1842*** (0.0000)	0.1299*** (0.0000)	0.1445** (0.0335)	0.0942 (0.1661)
Number of citations	0.2536*** (0.0000)	0.0984*** (0.0001)	0.2698*** (0.0001)	0.0772 (0.2565)
Number of citations weighted by simple impact factor	0.2222*** (0.0000)	0.0775*** (0.0018)	0.3150*** (0.0000)	0.1152* (0.0902)
Number of citations weighted by number of authors and simple impact factor	0.2294*** (0.0000)	0.1069*** (0.0000)	0.2702*** (0.0001)	0.1536** (0.0238)
h-index	0.2519*** (0.0000)	0.1017*** (0.0001)	0.2758*** (0.0001)	0.0684 (0.3235)

Note: The table reports Kendall's Tau-b (ties adjusted) statistics, with *p*-values in parentheses. For ease of interpretation, in all correlations, all the RePEc ranking values are multiplied by −1 so that 'larger' values represent 'higher' ranks. Therefore, a positive correlation means that higher academic performance is associated with higher external influence. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

weaker positive correlation with the RePEc rankings. For example, the correlation between external influence and the RePEc 'average rank score' ranking equals 0.132, while the correlations for 'number of citations' and 'h-index' equal 0.098 and 0.102, respectively. It therefore seems that internal academic impact is only weakly correlated with external impact, meaning that the importance ascribed to an economist within academia is only partially reflected in the scholar's external influence.

Admittedly, it could be argued that exploring only the top 100 academics (according to RePEc ranking) could produce different outcomes than this general sample of 723 economists. Yet according to the two columns on the right-hand side of Table 1, such is not the case: when the sample is much smaller, the correlations become less significant overall. Compared to previous findings, in which the Bing web page count produced various significant correlations with academic performance proxies, only 'number of citations weighted by simple impact factor' and 'number of citations weighted by number of authors and simple impact factor' show a statistically significant correlation (10 and 5%, respectively). For the Google pages, external influence is positively correlated with rankings based on 'average rank score', citation measures, and 'h-index' at a 1% level of significance and with 'number of journal pages weighted by simple impact factor' and 'number of journal pages weighted by number of authors and simple impact factor' at a 5% level.

The RePEc rankings, however, can be criticized as lower-bound performance measures because rather than registering all the economics journals, the RePEc generates citations by extracting the list of references (http://citec.repec.org/) from each document made available to its digital library in electronic format. At present, because of software limitations in reference identification (that is, PDFs must be converted to ASCII) and related requirements that the documents must satisfy (http://citec.repec.org/warning.html), only around 74% of these records have been analysed. Hence, in Table 2, we also employ metrics from two other sources used in economics and beyond, *Publish or Perish* (version 3), which enables a wide range of publishing metrics (see also Harzing 2010), and the *Web of Knowledge*.

Because many authors publish across different disciplines, we conducted both these searches with no constraints on journal of publication, which allowed us to capture the total internal academic impact rather than simply the specific impact on the author's primary research field. The searches were conducted within a 72-hour period (from 1 to 3 March 2013) to ensure as little variation as possible over time. As in the two columns on the right-hand side of Table 1, we restrict our analysis to the top 100 economists in the RePEc rankings.

As Table 2 shows, when using the *Publish or Perish* data, the different h-index scores show the strongest positive correlations with external impact, ranging from 0.227 (e-index with Google) to 0.495 (hI-index with Bing).[8] Nevertheless, external influence is not correlated with the important success metric, citations per paper; the correlations with age-weighted citation rate are either not statistically significant or have only borderline significance; and the *Web of Knowledge* metric shows no correlation with external influence for the top 100 researchers. Table 2 therefore supports the earlier observation: there is no (or only a weak) correlation between internal success and external influence.

'Superstardom', considered above by focusing on the top 100 economists, is also evident in the extensive system of awards on which academia relies and which serves as a tool for

8 Because all variables in Table 2 are continuous variables, we report the Pearson product–moment correlation.

Table 2. Correlations between external influence and total internal academic impact (*Publish or Perish* and *Web of Knowledge*)

Publish or Perish	Average: Google	Average: Bing
Citations	0.2361** (0.0181)	0.2928*** (0.0031)
Citations/years	0.2054** (0.0403)	0.2750*** (0.0056)
Citations/papers	−0.0125 (0.9017)	0.0287 (0.7769)
Average *N* papers per author	−0.2187** (0.0288)	−0.2375** (0.0174)
h-index	0.3005*** (0.0024)	0.3938*** (0.0001)
g-index	0.2559** (0.0102)	0.3361*** (0.0006)
hc-index (Contemporary h-index)	0.2672*** (0.0072)	0.3305*** (0.0008)
hI-index (Individual h-index)	0.4033*** (0.0000)	0.4946*** (0.0000)
hm-index (Individual h-index)	0.3760*** (0.0001)	0.4923*** (0.0000)
AWCR (Age-weighted citation rate)	0.1178 (0.2433)	0.1347 (0.1815)
AWCRpA (Normalized to the number of authors)	0.1695* (0.0918)	0.1827* (0.0688)
e-index	0.2273** (0.0230)	0.2916*** (0.0032)
Web of Knowledge		
Total citation count	0.0665 (0.5112)	0.0365 (0.7184)
Average annual citation	0.0545 (0.5905)	0.0004 (0.9971)

Note: The table reports the Pearson product–moment correlation, with *p*-values in parentheses; $n = 100$. The *Publish or Perish* metrics are described in detail in Harzing (2010) or at http://www.harzing.com/pop.htm. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 3. Correlation between external influence and prizes and awards received

	Average: Google	Average: Bing	Number of awardees
JBC medal	0.2485*** (0.0000)	0.2116*** (0.0000)	18
Nobel Prize	0.2451*** (0.0000)	0.2902*** (0.0000)	37
Frisch Medal	−0.0190 (0.6109)	−0.0212 (0.5699)	13
Distinguished Fellow of the AEA	0.0298 (0.4234)	0.0974*** (0.0088)	23
Foreign Honorary AEA	−0.0035 (0.9251)	0.0008 (0.9830)	19
Fellow of the Econometric Society	0.0972*** (0.0089)	0.1382*** (0.0002)	250
Fellow of the EEA	0.0060 (0.8715)	0.0286 (0.4432)	32
Emeritus Fellow of the EEA	0.1325*** (0.0004)	0.1413*** (0.0001)	23

Note: The table reports the Pearson product–moment correlation, with *p*-values in parentheses; $n = 723$. *, **, and *** represent statistical significance at the 1% level.

distinction. The most renowned award after the Nobel Prize is the John Bates Clark Medal awarded to a scholar under 40 'who is judged to have made the most significant contribution to economic thought and knowledge' (http://www.aeaweb.org/honors_awards/clark_medal.php). Becoming a Fellow of the Econometric Society is also considered prestigious (Hamermesh and Schmidt 2003) despite the substantial number of fellows (877 by the end of 2011; see Chan and Torgler 2012). Many JBCMs and Economic Society fellows later became Nobel laureates. The other awards for academic economists, although also prestigious, can be classified as somewhat less important. In Table 3, we show that overall, the level of the respective award's prestige is positively and significantly correlated with external influence as measured by the web page counts. The highest correlations are observed

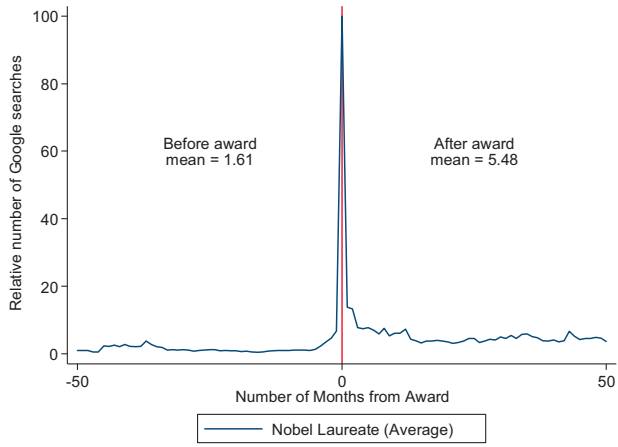

Figure 3. Google trends for Nobel laureates before and after the Nobel Prize.

for the Nobel Prize ($r = 0.290$) and the John Bates Clark Medal ($r = 0.249$), although external influence is also significantly positively correlated with being a Fellow of the Econometric Society and an Emeritus Fellow of the European Economics Association. In other cases, there is barely any correlation.

Nevertheless, it remains unclear whether these results are driven by the likelihood that the Nobel Prize or the John Bates Clark Medal will be given to a scholar with a strong external influence or by the fact that these awards actually have a positive impact on external influence. Figures 3 and 4 graph the results of a *Google* trend analysis[9] conducted between 25 and 27 February 2013, which extrapolated relative monthly search volume counts for each JBCM ($N = 6$) and Nobel laureate ($N = 16$) receiving the award between January 2005 and January 2013 (a 97-month period). A massive peak is evident in the month in which the award was announced, indicating a relatively high interest from the general public in the current winner of both awards. The relative search volume count is also statistically higher (at a 1% level of significance using a mean comparison *t*-test) during the 50 months 'after' award conferral (excluding the month of award announcement) than during the 50 months 'before' it.[10] This observation could suggest that the Nobel Prize and John Bates Clark Medal have a positive impact on external influence.

We then correct for the possibility that external influence might be substantially driven by the social attention following award reception by running Google and Bing searches on whether each scholar is a JBCM or Nobel Prize winner. We subtract the number of Google pages found from a normal name search result to eliminate Google/Bing hits related to the award. The correlation values obtained (see Table A2) are higher than those derived earlier for Bing but lower for Google (in particular for Nobel Prize winners). The robustness of the results for the JBCMs could indicate that researchers with a higher external influence are more likely than other researchers to earn this prestigious medal.

9 See http://www.google.com/trends/.

10 The difference in search volume remains statistically significant at a 1% level even when we exclude 5 months before and 5 months after the award announcement.

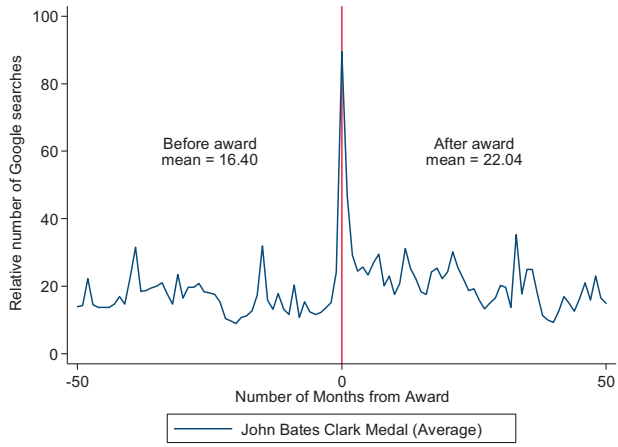

Figure 4. Google trends for JBCMs before and after the award.

To check whether the correlations remain the same once other factors are controlled for, we conduct a multivariate analysis using the ordinary least squares linear regression model. In particular, given the empirical evidence that educational background shapes academic researchers' career success (Chan and Torgler 2013), we examine how this background affects or even accentuates scholars' social impact. Again, we narrow our performance criterion to researchers with a strong recent publication performance, defined as at least one publication in the *AER*, *Econometrica*, or the *Journal of Political Economy* between 2005 and 2010. From among the over 1200 academics who published work in these three journals across the 6-year period considered, we identify 193 out of the 723 academics in our revised RePEc top 1000 list. We use the curriculum vitae of each academic to identify their doctoral university and year of graduation, and thus their academic age. To measure their university ranking position, we use the classification developed by Amir and Knauff (2008), which ranks the top 58 economics universities globally based not on research productivity but on the strength of the Ph.D. program as measured by the department's ability to place doctoral graduates in top-level economics departments or business schools. Because the ranking goes from 1 to 58, we classify all the universities with a constant value of 59, allowing us to create Top 10 and Top 20 dummies.

Based on the above variables, we then consider the following model:

$$\begin{aligned}\text{WEBPAGE}_i &= \beta_0 + \beta_1 AWARD_i + \beta_2 REPEC\_RANK_i + \beta_3 MALE_i + \beta_4 INS\_RANK_i \\ &\quad + \beta_5 ACADEMIC\_AGE_i + \varepsilon_i\end{aligned}$$

where i indexes the economists in the sample, WEBPAGE_i denotes the economist's number of non-.edu Google of Bing pages, $AWARD_i$ is a dummy variable for JBCM or Nobel laureate, $REPEC\_RANK_i$ is the RePEc ranking base on the 'average rank score', $MALE_i$ is a dummy variable for the scholar being a male, INS_RANK_i is the institutional ranking (or dummy variables for top 10 and top 20 universities), and $ACADEMIC\_AGE_i$ is the number of year since doctoral degree graduation. ε_i denotes the error term. The first two specifications (1a, 1b) in Table 4 are based on the 1–59 institutional ranking and include the dummy for whether a scholar is a JBCM or Nobel laureate. The next four specifications

Table 4. Determinants of external influence

Dependent variable	Google (1a)	Bing (1b)	Google (2a)	Bing (2b)	Google (3a)	Bing (3b)	Google (4a)	Bing (4b)
JBCM or Nobelist	17,799.8*** (3.12)	1627.2*** (5.14)	17,924.1*** (3.16)	1632.1*** (5.17)	17,802.7*** (3.14)	1633.5*** (5.16)		
JBCM but not Nobelist							26,751.8*** (4.17)	955.4* (1.90)
Nobelist no JBCM							13,754.1*** (2.96)	2120.0*** (5.81)
JBCM and Nobelist							14,267.2* (1.69)	1116.7* (1.69)
RePEc ranking	18.5*** (4.94)	0.3 (1.10)	18.8*** (5.05)	0.3 (1.20)	18.5*** (4.87)	0.3 (1.18)	17.4*** (4.66)	0.4 (1.41)
Male	6700.1*** (3.75)	618.6*** (2.80)	6571.9*** (3.71)	613.0*** (2.77)	6690.2*** (3.80)	618.1*** (2.80)	6500.8 (1.44)	630.4* (1.78)
Institutional ranking	3.1 (0.08)	0.0 (0.00)						
Academic age	−272.5*** (−2.72)	−11.0 (−1.32)	−275.0*** (−2.77)	−11.1 (−1.35)	−272.9*** (−2.73)	−11.0 (−1.34)	−205.3* (−1.78)	−16.0* (−1.77)
Top 10 institution			−1007.8 (−0.56)	−48.1 (−0.31)				
Top 20 institution					171.0 (0.10)	−52.2 (−0.27)	135.6 (0.05)	−45.7 (−0.22)
N	193	193	193	193	193	193	193	193
R-squared	0.250	0.184	0.251	0.184	0.250	0.184	0.261	0.204
Prob. > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Note: The values of RePEc ranking and Institutional Ranking are multiplied by −1. *t*-statistics are in parentheses. *, **, and *** represent statistical significance at the 10%, and 1% levels, respectively.

contain the dummies for Top 10 (2a, 2b) and Top 20 institutions (3a, 3b). Specifications (4a) and (4b) then further differentiate between JBCMs who are not Nobel laureates, Nobel laureates who are not JBCMs, and JBCMs who are also Nobel laureates.

As the results clearly show, ceteris paribus, the recipients of these prestigious awards generate substantially more external influence (for example, 17,800 more Google web pages) than all the other top researchers. The academics with the strongest performance are those who earned both the John Bates Clark Medal and the Nobel Prize. Again, however, the RePEc ranking is statistically significant only in the Google search process, never in the Bing analysis. This observation is confirmed in Table 5 by the fact that none of the sub-factor ranking variables are statistically significant in the Bing regressions. Interestingly, males seem to generate more external influence than females, but the institutional ranking of the doctoral university has no influence on external impact. In addition, when the Google pages are used as the dependent variable, our evaluation of a scholar's influence reveals a negative relation between external influence and academic age (years since Ph.D. or highest education). This finding suggests that a less senior economics scholar may be able to counterbalance shortcomings such as fewer citations by exerting an important impact outside academia.

The analysis in Table 5 examines the major sub-factors reported in Table 1 in place of the overall ranking information. As the table shows, these sub-factors, like the overall rankings, are not statistically significant. When Google pages are the dependent variable, however, the citation proxies and weighted journal pages do reach statistical significance. These findings do not change in the robustness tests carried out using log Google and Bing values as the dependent variable: award recipients tend to have more external impact.

Our estimates, however, can only provide an overview of the relation between internal impact and external influence because our cross-sectional analysis, unlike a longitudinal analysis, cannot observe the evolvement and dynamics of how internal success impacts the societal influence of an academic (causal relation). The sample selection bias resulting from the exclusion of observations based on the 5% spurious entries rule might also raise concerns, especially when there is limited access to the actual search algorithm employed by Google and Bing.

In general, our methodological approach has two major problems: some search results may have been included that should not have been whereas some authors may not be included that should be, which could result in measurement errors. For example, there might be cases in which the first 50 pages but not the remaining web pages (or vice versa) refer to a scholar that the search algorithm (for example, Google PageRank) ranks as having the highest relevance. This situation would introduce both upward and downward biases when the number of web pages is used to proxy external influence. One possible remedy would be to increase the number of search results assessed manually and look not only at the first 50 pages but also at the middle and last 50 pages.

Similarly, it is debatable how well the Google and Bing web pages actually capture a scholar's influence in society. Despite little doubt that most traces of a scholar's external influence can be found in all these web pages, the question remains of how strongly the total number of web pages is correlated with the scholar's intensity in, for example, giving advice to politicians, contributing to public policy change, or acting in the media. Using the top 100 economists in Table A1, we find that the number of Google pages has a strong positive correlation with the number of entries in Google News ($r = 0.82$, significant at 1% level),[11] indicating a strong correlation between this narrow proxy of external influence and that used in our analysis.

11 Data collected on 11 February 2015.

Table 5. Determinants of external influence (extended version)

Dependent variable	Google (5a)	Bing (5b)	Google (6a)	Bing (6b)	Google (7a)	Bing (7b)	Google (8a)	Bing (8b)
JBCM but not Nobelist	28,970.9** (2.10)	1081.5** (2.00)	28,589.0** (2.08)	1048.7* (1.95)	28,392.2** (2.09)	1011.0* (1.88)	28,598.7** (2.10)	1040.9* (1.95)
Nobelist no JBCM	12,627.9** (2.03)	2079.9*** (5.08)	13,129.4** (2.10)	2097.2*** (5.08)	13,331.4** (2.12)	2111.9*** (5.14)	12,594.7** (2.04)	2091.0*** (5.17)
JBCM and Nobelist	14,033.1*** (3.06)	1123.9*** (3.68)	13,578.6*** (2.88)	1130.5*** (3.66)	14,496.8*** (3.07)	1134.6*** (3.62)	14,234.0*** (3.18)	1130.5*** (3.68)
RePEc rankings								
# journal pages	0.4 (0.36)	0.0 (−0.60)						
# citations	8.3*** (3.76)	0.1 (0.53)						
# journal pages weighted by simple impact factor			5.1** (1.99)	0.0 (0.22)				
# citations weighted by simple impact factor			6.7*** (2.94)	0.0 (0.30)				
# journal pages weighted by number of authors					3.8** (2.13)	0.1 (0.60)		
# citations weighted by number of authors					7.9*** (3.47)	0.1 (0.44)		
h-index							10.3*** (4.08)	0.1 (0.53)
Male	7945.4*** (4.38)	692.2*** (3.12)	5849.1*** (3.45)	629.3*** (2.73)	5973.4*** (3.40)	595.9** (2.52)	6696.4*** (3.47)	638.8*** (2.92)
Institutional ranking	23.5 (0.56)	0.6 (0.13)	26.4 (0.63)	1.1 (0.27)	3.1 (0.08)	0.7 (0.15)	19.8 (0.50)	1.0 (0.22)
Academic age	−101.4 (−1.19)	−10.7 (−1.24)	−87.9 (−1.04)	−12.1 (−1.38)	−143.4 (−1.63)	−14.0 (−1.55)	−101.8 (−1.28)	−12.3 (−1.48)
N	193	193	193	193	193	193	193	193
R-squared	0.230	0.198	0.231	0.197	0.237	0.199	0.235	0.197
Prob. >F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Note: The values of all RePEc rankings and Institutional Ranking are multiplied by −1. *t*-statistics are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

5. Conclusions

Measuring scholarly activity has emerged as an important topic, not least because of university administrators' strong incentives to find metrics for departmental progress, as well as academics' keenness to assess their relative professional standing and the quality of their university environment (Scott and Mitias 1996; Torgler and Piatti 2013). To date, however, academia has relied on a narrow set of internal factors such as publications or citations for its national and international comparisons. Yet in reality scholarly impact is multidimensional (Aguinis et al. 2012) and includes a variety of tasks. Academics can, for example, be categorized as either insiders or locals who are strongly involved in institutional services and in close interaction with members of the same university, or as outsiders and cosmopolitans who bring new ideas, research quality, and outside prestige to the university through their research and activities in national and international professional organizations (Klahr 2004; Wilson 2013). Teaching and academic self-governance can also be classified as local activities despite the external influence later exerted by former students. Academic influence on the broader society, however, goes well beyond the local level, especially in the face of new technologies that enable broader measurement of scholars' influence in the wider societal discourse. Yet little research has been done on such external influence, a void that this article aims to fill by examining how internal measures of influence within academia relate to the external influence of these same scholars.

Our analysis of the number of Google and Bing web page counts of 723 economics scholars reveals only a low correlation between internal and external influence. This result holds even though we employ a large set of metrics for internal influence, namely weighted and unweighted journal publications, citations, and the h-index. We do identify a difference between academic and external rankings of more than 150 positions for almost 50% of the scholars in our data set. However, although our analysis of the top 100 researchers in RePEc shows a small association between external influence and our academic performance variables, our alternative data source, the *Web of Knowledge*, reveals no significant correlations between these two variables. The results for the *Publish or Perish* data, however, are somewhat more positive (correlations up to 0.5). Taken together, these results support Aguinis et al.'s (2012) findings for scholars in management: their impact within academia is not mirrored in their external influence. Rather, our examination of the impact of academic economists suggests that external influence is more strongly correlated with the reception of major awards like the John Bates Clark Medal and Nobel Prize.

Our findings raise many questions for future investigation, including how and why scholars achieve high levels of external influence. One important goal might be to explore fluctuations over time, an approach made possible by the Google and Bing search engines. Also worth considering are other sources that capture external influence; for example, new and popular media, official documents, and patents.

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Appendix

Table A1. Ranking of economics scholars by average number of web counts

Name	Ranking: Google	Ranking: Bing	Ranking: RePEc (average rank score)	Average # of Google pages
milton friedman	1	2	265	922,667
nouriel roubini	2	1	596	7,120,00
amartya sen	3	5	231	412,000
dani rodrik	4	3	59	274,000
christopher f. baum	5	618	15	262,000
daniel kahneman	6	10	178	229,667
joseph e stiglitz	7	4	3	222,000
olivier blanchard	8	19	12	153,333
n gregory mankiw	9	55	32	122,000
ben s bernanke	10	11	29	118,000
hans werner sinn	11	7	143	111,667
michele boldrin	12	14	447	105,333
john quiggin	13	9	277	103,667
alvin e roth	14	17	117	79,833
daron acemoglu	15	41	6	70,567
austan goolsbee	16	12	831	68,267
steven levitt	17	27	189	67,633
andrei shleifer	18	284	1	65,933
kaushik basu	19	6	367	62,933
william easterly	20	79	110	61,300
luigi zingales	21	49	89	58,767
andreu mas colell	22	15	678	49,067
paul a samuelson	23	37	169	48,433
lawrence h. summers	24	68	23	45,800
robert j. shiller	25	113	82	44,367
esther duflo	26	82	227	43,733
lars e. o. svensson	27	374	48	43,700
jean tirole	28	264	8	42,967
lucrezia reichlin	29	16	339	42,833
john b taylor	30	18	56	42,833
james poterba	31	372	41	42,033
jonathan gruber	32	29	219	39,333
tito boeri	33	60	836	38,767
franco modigliani	34	36	610	38,700
xavier sala imartin	35	35	152	38,633
gary gorton	36	91	331	38,400
thomas piketty	37	31	613	38,167
john list	38	23	77	38,033
ross levine	39	299	25	37,600
christopher sims	40	24	53	36,167
justin wolfers	41	21	633	35,867
alberto alesina	42	209	27	35,400

(continued)

Table A1. Continued

Name	Ranking: Google	Ranking: Bing	Ranking: RePEc (average rank score)	Average # of Google pages
mark gertler	43	290	16	35,267
gary s. becker	44	176	20	35,067
patrick honohan	45	20	919	34,733
robert j. barro	46	369	4	33,833
simon kuznets	47	25	942	33,767
david weinstein	48	42	451	32,767
richard layard	49	57	544	32,167
michael kremer	50	166	442	31,033
maurice obstfeld	51	212	35	30,867
raghuram g. rajan	52	120	45	30,800
emmanuel saez	53	28	361	30,000
thomas j .sargent	54	67	11	30,000
carmen m. reinhart	55	180	51	29,600
francesco giavazzi	56	94	477	29,233
david romer	57	77	121	28,700
paul r. krugman	58	125	19	27,633
alan b. krueger	59	118	37	26,767
elhanan helpman	60	228	24	26,033
jean paul fitoussi	61	47	834	25,633
ernst fehr	62	213	92	25,600
james j. heckman	63	181	2	25,100
michael greenstone	64	61	968	25,067
richard h. thaler	65	81	125	25,067
t. n. srinivasan	66	139	452	24,867
xavier vives	67	132	180	24,767
simeon djankov	68	152	267	24,000
kenneth j. arrow	69	59	291	23,800
ashoka mody	70	391	641	23,533
edward c. prescott	71	124	17	23,167
sendhil mullainathan	72	225	406	23,100
guido tabellini	73	208	108	22,867
alan s. blinder	74	121	134	22,733
reinhard selten	75	58	806	22,667
douglass c .north	76	74	420	22,167
martin ravallion	77	424	66	21,833
ricardo hausmann	78	92	713	21,600
narayana kocherlakota	79	13	370	21,333
costas azariadis	80	458	697	21,300
charles wyplosz	81	119	582	21,300
eswar prasad	82	110	468	21,100
james h. stock	83	375	14	21,100
oliver e. williamson	84	63	692	21,067
enrico moretti	85	122	479	21,033
george a. akerlof	86	65	67	20,933
richard blundell	87	304	22	20,433

(continued)

Table A1. Continued

Name	Ranking: Google	Ranking: Bing	Ranking: RePEc (average rank score)	Average # of Google pages
robert c. merton	88	62	94	20,433
bruno s. frey	89	301	81	20,067
william d. nordhaus	90	97	185	20,067
lawrence f. katz	91	382	49	20,000
robert w. vishny	92	398	31	20,000
luigi guiso	93	84	296	19,567
lucian bebchuk	94	334	851	19,467
sheridan titman	95	238	238	19,467
campbell r. harvey	96	447	149	19,400
eduardo levy yeyati	97	386	872	19,367
steven shavell	98	230	491	19,200
zvi griliches	99	249	88	19,167
george loewenstein	100	93	343	19,133

Table A2. Correlations based on corrected values

Searches	Average: Google	Average: Bing	Change
John Bates Clark Medallists			
"Name" - ("Name" + "John Bates Clark")	0.1872 (0.000)	0.2675 (0.000)	↓(G) ↑(B)
"Name" - ("Name" + "John Bates Clark Medal")	0.1848 (0.000)	0.2647 (0.000)	↓(G) ↑(B)
"Name" - ("Name" + "JBC Medal")	0.1779 (0.000)	0.377 (0.000)	↓(G) ↑(B)
Nobel Prize Winners			
"Name" - ("Name" + "Nobel")	−0.1127 (0.0024)	0.3339 (0.000)	↓(G) ↑(B)
"Name" - ("Name + "Nobel Prize")	0.0770 (0.0385)	0.3425 (0.000)	↓(G) ↑(B)

Note: G: Google, B: Bing. Using the average values of these two searches, we report the changes from the correlations reported in Table 3. The search process for John Bates Clark Medallists was conducted on 27 April and 5 May and for Nobelists on 24 May and 30 May.

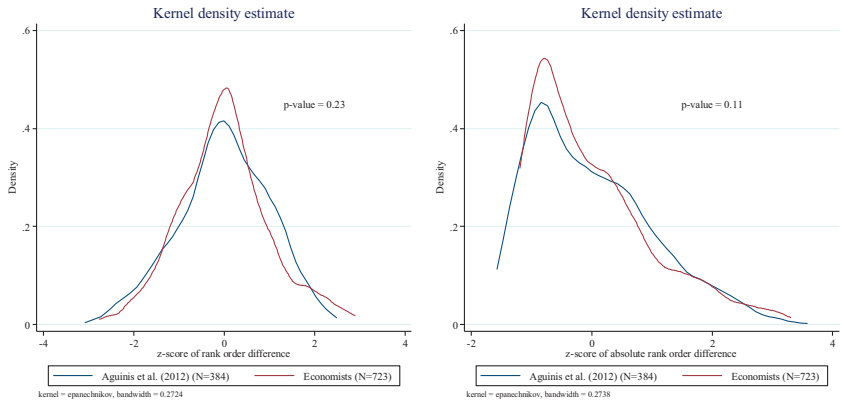

Figure A1. Rank order differences compared to Aguinis et al. (2012). The Aguinis et al. data are taken from Table 4 (pp. 116–24). The *p*-values correspond to the two sample Kolmogorov–Smirnov equality-of-distributions test.