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ON THE EVALUATION OF ECONOMIC RESEARCH: THE CASE OF ITALY

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On the Evaluation of Economic Research: the Case of Italy

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Abstract: The Italian case can be considered as an internationally relevant example to suggest a critical reflection on the evaluation criteria adopted in research assessment exercises, pointing at the need of clear and shared guidelines based on transparency and accountability and aiming at preserving (or even encouraging) the pluralism of ideas. Our findings support the view that if research institutions are encouraged to engage only in those lines of research that are likely to receive the highest rating according to the adopted evaluation criteria, a convergence process is to be expected within Economics, resulting in a disregard of heterodox schools and historical methods in favour of mainstream approaches and quantitative methods. In our view, a proper fine-tuning of the assessment methodology is needed, before subsequent rankings can be used as a guide for the allocation of public financing among research institutions. In the case of Economics, this means overcoming the limits of commonly adopted peer review approaches, through the development of proper evaluation designs and the integration of qualitative appraisals with quantitative indicators. In order to preserve pluralism and originality of research, we propose a simple quantitative index based on field-normalization.

Keywords: research evaluation, contemporary research in economics, Italy

JEL codes: A11, A14, B20, B40, B50

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1. Introduction

Rankings of universities have become widespread in recent years. Various subjects (students, media, governments) are becoming increasingly interested in ranking universities (or faculties, or departments), as a response to ongoing institutional and social changes. On the one hand, decreasing barriers to national and international mobility, along with higher specialisation and competition for high-educated individuals in the labour markets, make students increasingly concerned about the quality of higher education institutions; on the other hand, the unavoidable settlement of a competitive environment among academic institutions forces governments (and other funding agencies) to adopt effective evaluation systems, in order to award quality in various fields (research, teaching, etc.) and to provide a rationale for a proper allocation of funds.[1]

Indeed, some critical aspects have emerged from the ongoing evaluation exercises. Cost effectiveness of evaluation processes has been repeatedly questioned[2] [1, 2]. Disagreements have occurred concerning what evaluation exercises should actually evaluate (that is, the "object" of evaluation: publications, research projects, attractiveness, management of resources, and so on), at what level (universities, faculties, departments), in which perspective (e.g. award of "excellence" vs. assessment of the average quality of faculties/departments) and what methodology is best suited to the different purposes (for instance, *ex-ante* or *ex-post* assessments).

As for the evaluation of research, which is the object of this article, the methodological debate mainly concerned the utilisation of peer reviewing *vis-à-vis* bibliometric indicators [3]. The shortcomings of peer review approaches are usually recognised in the high level of subjectivity of judgements, the risk of conflicts of interests, and poor overall transparency of the evaluation processes [4, 5] as well as in a bias against young people and original lines of research [6]. Conversely, bibliometric methods (in particular, citation analyses) have been often criticised for their heavy reliance on automatisms, for the risks stemming from inappropriate design and calculation of indicators, and for a difficult applicability to certain disciplines (namely, humanities and social sciences).

More substantial critiques to research evaluations regard the risks of distorting the incentives of both evaluators and evaluated people by inducing, on the one side, an excessive reliance on predetermined metrics for the assessment of research products, and, on the other side, the appearance of "counter-strategies" to evaluation exercises.[3] In particular, it has been emphasised how the aim of maximising the expected outcome from evaluations by evaluated people may harm pluralism and originality of research [7, 8].

This article adds to this debate by analysing the results of the first Italian research evaluation exercise (VTR, *Valutazione Triennale della Ricerca*), referring to the 2001-2003 period. We sketch the main characteristics of this assessment, pointing out its strengths as well as its (relevant) drawbacks, in light of its application to the social sciences and, specifically, to

[1] The relevance and the limits of the ranking approach have been pointed out by the IREG (International Rankings Expert Group), which in 2006 released the "Berlin Principles on Ranking of Higher Education Institutions", a document providing rules and recommendations for the production of reliable rankings (based on clear purposes and target groups, transparent methodologies, proper design and weighting of indicators, collection and processing of data, presentation of ranking results). This document, accompanied in 2006 by the Tartu Declaration on Rankings released by the Coimbra group (stating that "ranking of universities is here to stay"), comes along the growing diffusion of worldwide rankings of universities.

[2] This critique usually regards the sustainability of peer review processes, which, when chosen as evaluation methodology, periodically involve the participation of a substantial share of the academic personnel.

[3] This can be considered as a particular case of the so-called Goodhart's law (1975), according to which when a social or economic indicator is made a target for addressing social or economic policy, it will eventually lose informative content.

Economics. Our findings support the view that if research institutions are encouraged to engage only in those lines of research that are likely to receive the highest rating according to the adopted evaluation criteria, a convergence process is to be expected within Economics, resulting in a disregard of heterodox schools and historical methods in favour of mainstream approaches and quantitative methods: ultimately, research pluralism may be harmed. Accordingly, in our opinion, a proper fine-tuning of the assessment methodology is needed, before subsequent rankings can be used as a guide for the allocation of public financing among research institutions.

More generally, the Italian case can be considered an internationally relevant example to suggest a critical reflection on the evaluation criteria adopted in research assessment exercises, pointing at the need of clear and shared guidelines based on transparency and accountability and aiming at preserving (or even encouraging) the pluralism of ideas. In the case of Economics, in our view, this means overcoming the limits of commonly adopted peer review approaches, through the development of proper evaluation designs and the integration of qualitative appraisals with quantitative indicators.

In what follows, after a short description of the Italian evaluation exercise (section 2), we provide an in-depth examination of its shortcomings and of their consequences on the evaluation of research in Economics (section 3). In section 4 we complement the analysis through a quantitative assessment, by comparing figures from the (publicly accessible) database of evaluated publications with a larger database of economic publications, the EconLit dataset. In section 5 we then propose simple quantitative indicators based on bibliometric criteria, with the aim to suggest assessments of research institutions based on a "mix" of peer reviewing and quantitative appraisals. A final section concludes and draws some policy suggestions.

2. The VTR evaluation exercise: purposes and methodology

Italy followed with some delay the experience started by other European countries in the field of evaluation of academic research. The first official evaluation of Italian universities and research institutions (VTR), sponsored by the Ministry for Research and managed by the CIVR,[4] an ad-hoc governmental committee, was set up in 2005 for the evaluation of research output produced between 2001 and 2003. This exercise focussed exclusively on research output, in the wake of well-established university evaluation systems such as the RAE (Research Assessment Exercise) in the United Kingdom or the Dutch periodical assessment of research made by the VSNU (the association of Dutch universities). For a review of evaluation systems in European and non-European countries, see Geuna and Martin [13].

The VTR assessment was conducted through a qualitative peer-review process on a sample of research output selected by participating research institutions. The selection of research products (in most cases, publications) occurred in a "top-down" fashion, as heads of departments (and, at higher level, of faculties) were deputed to choose what products submit to the evaluation. Products' ratings were then averaged at the level of institutions[5] with the aim to construct disciplinary rankings.

Before and during the exercise, claims have been made that the resulting rankings of institutions would affect the future allocation of public funds, despite the fact that the VTR

[4] CIVR stands for "Comitato di Indirizzo per la Valutazione della Ricerca".

[5] Throughout the paper, we will use "universities" and "research institutions" as synonyms, because only two institutions evaluated within the field of economics are not universities, and because the evaluation did not concern the quality of teaching.

exercise was conducted as a typically ex-post assessment.[6] Indeed, the exercise was frequently characterised as being a pilot.[7]

The exercise proceeded as follows (see Lippi and Peracchi [14], for details). Fourteen research areas were recognised, which represented the units of analysis (therefore, neither faculties nor departments were evaluated directly[8]). Universities had to submit a number of research products equal to half the number of full-time equivalent academic staff (full professors, associate professors and research fellows). However, this proportion was to be respected at the level of university, not of areas: universities were free to submit, for example, relatively more publications (or other research products) in their specific area(s) of excellence.

For each area, a panel of national and international experts was nominated; submitted publications were distributed among panel's members, according to their specific expertise. Each panelist was responsible for proposing a rating to the products assigned to her/him; in turn, for each publication the rating was formulated according to two or more independent external referees' reports. Finally, the whole panel voted on panelists' proposals.

While no rated list of journals or publishers was officially adopted, referees were requested to evaluate research products along the following criteria: i) quality, i.e. ranking of the product with respect to scientific excellence "in a value scale shared by the international scientific community"; ii) importance/relevance, i.e. the added value of the product for the advancement of knowledge within the relevant field and for science in general, as well as resulting social benefits, in terms of suitability, effectiveness, promptness and duration of the relapses; iii) originality/innovation, i.e. the contribution towards new acquisitions and progress of knowledge, in the reference sector; iv) internationalisation, i.e. the international stance of the product, in terms of importance, competitiveness, circulation and appreciation by the scientific community, including explicit collaboration with foreign researchers and research groups.[9]

According to these criteria, research products were rated in four merit degrees (from "excellent" to "limited").[10] For each area, final rankings for each university were produced by means of a weighted average of the rating of the submitted products.[11] Finally, within each area, universities were partitioned in four size classes according to the number of submitted products,[12] and rankings were presented separately for each size class.

3. Some advantages, many criticalities: the case of Economics

[6] An *ex-ante* evaluation was added to the *ex-post* evaluation in the case of "special projects", which, however, were very rare and did not concern economics.

[7] Notwithstanding the drawbacks that emerged from the first VTR evaluation, a debate recently arose, among economists and concerned experts, about the possibility to use the VTR rankings as a means to allocate a share of the public financing of universities [15, 16, 17]. Recently, the government approved a decree mandating that 7 per cent of the funds yearly transferred to universities will be allocated according to the quality of education, research and infrastructure (this share should increase in the future up to 30 per cent).

[8] For instance, all economists of a same institution were evaluated in a same research area, regardless of their department or faculty of origin.

[9] With exclusive regard to patents and some other research products (such as spin-off firms), these criteria were integrated by a fifth: the socio-economic impact.

[10] As a matter of fact, 30% of products in all areas were rated excellent, 46% good, 19% acceptable, and only 5% limited.

[11] Weighting occurred according to this formula: $W = E + 0.8*G + 0.6*A + 0.2*L$, where E, G, A and L represent the number of products in each merit class (E = excellent, G = good, A = acceptable and L = limited).

[12] In each area, universities were considered "mega" structures if they submitted at least 75 products, "big" structures if they submitted 25 to 74 products, "middle-sized" structures if they submitted 10 to 24 products, and "small" structures if they submitted less than 10 products.

The results of the first evaluation of public research in Italy are undoubtedly positive, in general terms. The VTR assessment represented a first step towards a change in the attitude of universities and researchers towards accountability and merit, hopefully with positive offspring, in terms of research quality, competitiveness and attractiveness of Italian universities. However, the outcomes of this first assessment also provide some food for thought. Indeed, its implementation brought about some criticalities, concerning both the methodology *per se* and its application to the human and social sciences, and to economics in particular.

1) *Sample selection.* Concerning the methodology, it seems important at first to emphasise that the evaluation, as it was conducted, was not based on a representative sample of research products. No guidelines for the choice of submitted publications were produced: as a consequence, if universities were to submit publications so as to closely match the composition of their research output, they would have been disadvantaged with respect to those which chose to present only their (perceived) best publications.[13] Accordingly, faculties whose academic staff was composed by a little share of top-range researchers (at least one) and a larger share of mediocre ones had high chances to rank better than faculties employing, on average, only "good" research personnel.[14]

2) *Perspective*. The issue of what rankings are expected to assess appears of utmost relevance: should they award the average quality of research or should they only compare the best research products (the "excellence")? In our opinion, although the second criterion could be effective in allocating funds to the most promising lines of research, it may bring about some problems of asymmetric information: if funds are allocated to faculties (and not to single researchers, nor to research projects) according to the evaluation rankings, those unproductive researchers who work in top-ranked faculties will be awarded without merit. Conversely, if the former criterion is applied, top-researchers working with mediocre colleagues could be harmed, but rankings will be probably more indicative to the stakeholders (students, academics, government, etc.) of the average quality of institutions.[15] According to this criterion, the participation of all the academic personnel (or, at least, of a large share of it) to the evaluation exercises should be required.[16]

3) *Clarity of goals and transparency of procedure*. As for the peer review procedure, it should be remarked that the whole system was surrounded by a substantial lack of clarity about methods, aims and procedures, in particular for what concerns the interpretation of the evaluation criteria presented in the previous section. In general, referees were granted substantial freedom of interpretation, leading to potential disparities in the evaluation of products. Moreover, referees' reports were never made public, not even anonymously. The resulting lack of transparency inhibited the possibility to carry out a process of monitoring and evaluation of the evaluators, which should be an integral part of all evaluation exercises.

[13] Moreover, no reference to the productivity of researchers was made.

[14] This problem was more evident in small structures, which, being committed to submit a smaller number of products (less than ten), could more easily present a larger share of publications from the same author(s).

[15] Two corollaries emerge from this reasoning. First, research excellence should be evaluated separately from overall university rankings (for instance, by granting funds to relevant research projects, submitted to ad-hoc evaluating commissions). Second, only the application of an "average" evaluation criterion could encourage a healthy competition among universities in attracting the best researchers in each field, rather than favouring the mobility of "top" researchers with the only purpose of maximising expected rankings.

[16] The drawbacks of such an approach, when applied to a peer-review evaluation, stand in the costs and in the complexity of the procedure, which in the long run may even outweigh benefits [7]. For these reasons, in the UK (where up to four research outputs for each research-active staff member could be submitted to evaluation) a transition to simpler, quantitative formulas for the research evaluation has been advocated for, though abandoning the peer review assessment may cause other kinds of problems [18].

4) *Biases in the peer review process*. The subjectivity of peer reviewing can lead to biases in the evaluation of certain sub-disciplines if a "value scale shared by the international scientific community" (as required by the VTR guidelines) does not exist or is not unquestionably identifiable. This problem is likely to arise mainly in the social sciences, and in Italy it has been explicitly uncovered during the activities of the Area 13 Panel, assessing research in Economics and Statistics.

The activity of this panel has been characterised by a number of points of dissent, as the panelists did not reach a consensus agreement on the rating of about one third of total products (whose merit grade was decided by majority voting),[17] while in some cases they decided to consult further external experts acting as additional referees .

At the end of the evaluation exercise, one of the six panelists in charge for the Economics area (Luigi Pasinetti) presented a *Note on points of dissent* (in English language), questioning the existence of a shared framework to formulate unambiguous judgements on the quality of research in economics, and pointing out that such a benchmark cannot be identified with the mainstream paradigm of neoclassical economics, as other panelists seemed to maintain. In his opinion, adopting such a paradigm would penalise research areas that do not achieve sufficient visibility on mainstream journals including most applied research on the Italian economy, which fails to meet the internationalisation criterion, but nonetheless it is essential to economic policy in Italy.

These arguments are not new in the evaluation literature. As argued in the introduction to this article, Lee and Harley [9], Lee [10] and Lee and Elsner [11] pointed out the drawbacks of the UK Research Assessment Exercise in a similar vein. In our opinion, it is worth noting that these critiques may assume a relevant dimension even *within* mainstream approaches. In fact, reliance on evaluation criteria based mainly on international visibility may disproportionately favour consolidated research areas [6, 7], hindering the development of new fields by young researchers. Moreover, while the anonymity of peer review processes is now threatened by the efficacy of internet search engines, it is likely that within specific streams of research real experts are competitors, so that for referees conflicts of interests may arise.

5) *Visibility as a proxy for quality*. If these critiques were taken into account, research products should be evaluated looking at their intrinsic quality, according to the specific standards of each sub-discipline and without considering their typology (journal article, book, book chapter), language and place of publication. In spite of this, the final VTR report concerning the Economics Area stressed that articles published in journals presenting an Journal Impact Factor (IF) received on average higher ratings, and that a significant positive correlation emerged between articles' merit grade and journals' IF.[18]

However, it appears clear that this evidence can be interpreted in two opposite ways, according to the assumed direction of causality: in the final report for the Area 13, it was deemed as a proof that the assessment correctly awarded the "real quality" of research products. On the contrary, in Pasinetti's *Note* it was interpreted as a source of further doubts on the use of information by referees: indeed the correlation may show that papers were positively assessed *because* they were published on high-IF journals. Actually, according to the *Note,* several referees explicitly stated the IF as a signal of the quality of the evaluated

[17] For a summary of the activities in Area 13, covering Economics and Statistics, see the final relation (*Relazione finale di Area*), available in Italian language on http://www.civr.it.

[18] This evidence is mentioned in the final report of the Area 13 and confirmed by Lippi and Peracchi [14]; notably, Franco Peracchi was the chairman of the Area 13 Panel. However, the claim cannot be verified, as referees' reports were never made available during or after the evaluation exercise.

products.[19] Therefore, even if the official CIVR guidelines did not include any rated ("diamond") list of journals, referees' practice was frequently far from this principle.

As a matter-of-fact, while a peer-review evaluation should use information about journals (and the IF) only as a support information, its use as an analytical tool is risky and may lead to significant biases. Various studies underline the failures of the IF both as a device to rank journals along with their quality, and as a predictive instrument to evaluate single papers according to the place where they are published [20, 21, 22, 23].[20]

In the field of economics, Oswald [18] shows that the number of citations after 25 years, as recorded by the *ISI Web of Science* for articles published in a number of issues of top-journals, can vary considerably: to the point that several most cited articles in middle-range journals fare much better than many articles published in "top" journals. Indeed, a number of top-journal articles exhibit zero citations even after a so long time span, and according to Oswald their publication can be regarded as editors' inevitable mistakes.

6) *Lack of pluralism*. Crucially, it appears clear to us that the criteria adopted for the evaluation of research may affect the content and the direction of future research itself, and specifically that criteria based (even informally) on international visibility can bring to abandon less diffused lines and methodologies of research. In the case of Italy, this may bring to abandon a certain tradition of "doing economics", based on historical research and heterodox approaches, which has been followed by a not negligible number of researchers[21] (see next section).

Specifically, as the interest for studies on Italy's economy and policy is by necessity restricted to Italy's boundaries (and a few specialists abroad), assuming citation habits as constant, it follows that visibility on international journals will be comparatively lower for works which are directly relevant for Italy's policymaking than for works on – say – the US economy. More generally, a serious threat is posed for "periphery" countries, where such criteria may undermine the diffusion of country-specific analyses, thus reducing the relevance of research in terms of impact on society and the economy [25]. Italy can then be considered as a case-study of a larger issue.

4. Implications of the VTR methodology: an empirical exercise

The 2001-2003 VTR evaluation exercise provides a good framework to illustrate the points raised in the previous paragraph. In what follows, we compare two datasets: one is composed of the publications submitted to the VTR in the fields of Economics and Statistics (the Area

[19] Pasinetti [19, p. 5]: "It is first hand documentary evidence from the referees' reports I had read, before offering (or denying) my cross-panelist consensus. The referees (two for each product) had to fill in answers to 4 different questions concerning: quality, relevance, originality, internationalisation. Cases like the following was the first cause of my denying consensus (without any effect, being always in a minority). Quality of the product: 'This paper is published in a top field journal, the IF of the journal is high, hence the paper is excellent' or conversely (always on quality of the paper) 'this paper is published in my opinion in a non serious journal [in the specific case of this quotation it was the *Journal of Post Keynesian Economics]*, hence the quality is limited'. Notice that the evaluation I am referring to is on *quality*, not on *internationalization* of the product!".

[20] In particular, it should be noted that the distribution of citations is usually highly skewed; accordingly, it is not recommendable to assign to a single article the number of citations received by the "average" article within a journal (that is, the IF).

[21] For a brief overview of research paradigms in contemporary Italian economic thought see Pasinetti and Roncaglia [24].

13); the other is the EconLit database, limited to the publications authored by academic researchers located in Italy, in the years 2001-2003.[22]

It should be noted that none of the two datasets represents the universe of scientific output by Italian economists in the period considered. Specifically, the VTR dataset is self-selected as research institutions possibly selected products with the aim of maximising their rating (and therefore their prospective financing from the government) as shown by Corsi et al. [26]. Conversely, the EconLit dataset includes the most internationally visible products, neglecting most works in Italian or other languages, and discarding certain typologies such as conference proceedings and working papers edited by Italian institutions. Nonetheless, it should be noted that a high number of economic journals published in Italy (almost 40) are included in the EconLit database.[23]

As none of the datasets is representative of the whole production of economists affiliated to Italian research institutions, it is difficult to enquire into how they relate to the total scientific output. However, the broader picture provided by the EconLit dataset, compared to the self-selected nature of the VTR one, allows us to consider the former as a benchmark to understand how faculties decided to portray themselves for the evaluation exercise.

The EconLit dataset exhibits 2709 entries in the period 2001-2003; more than 90% of these publications present at least one JEL code.[24] Conversely, 1007 products are included in the VTR dataset. Since the VTR dataset includes products in both Economics and Statistics, when only Economics is considered, it collapses to 597 products (22% of the EconLit figure). By matching the datasets, we were able to assign one or more JEL codes to 361 of them (almost 60%).[25] Descriptive statistics on these datasets are presented in Appendix B, Table 2.

In what follows we will focus on the sub-samples of products exhibiting at least one JEL code. Using JEL codes, we were able to classify publications into 8 broad sub-disciplines (according to the criteria described in Appendix A): *Applied Economics, Economic Policy, Heterodox Economics, Econometrics and Quantitative Methods, Economic History, History of Economic Thought, Corporate Finance and Management, Other*. It should be noted that *Other* here is to be intended as a residual category including all publications whose JEL codes (by construction, mainly concerning field-specific theoretical topics) do not fall into the other categories. Allocation across several sub-disciplines was allowed for products exhibiting more than one JEL code.[26]

By comparing the two sub-samples, as shown in Figure 1, a substantial difference emerges in the representation of disciplines. In particular, with respect to the EconLit dataset, the VTR

[22] In order to maintain comparability, we excluded from the analysis the few Ph.D. theses, working papers and review articles recorded in the EconLit database, because none of these typologies of products could be submitted to the VTR exercise.

[23] As it will appear in what follows, the incomplete coverage of the EconLit database concerns some product typologies, mainly books and book chapters in Italian, which were often selected for submission to the CIVR (especially in the field of Management and Business Studies). As a result, the two datasets are not fully comparable: the EconLit dataset is much larger but the CIVR dataset is not fully included in it.

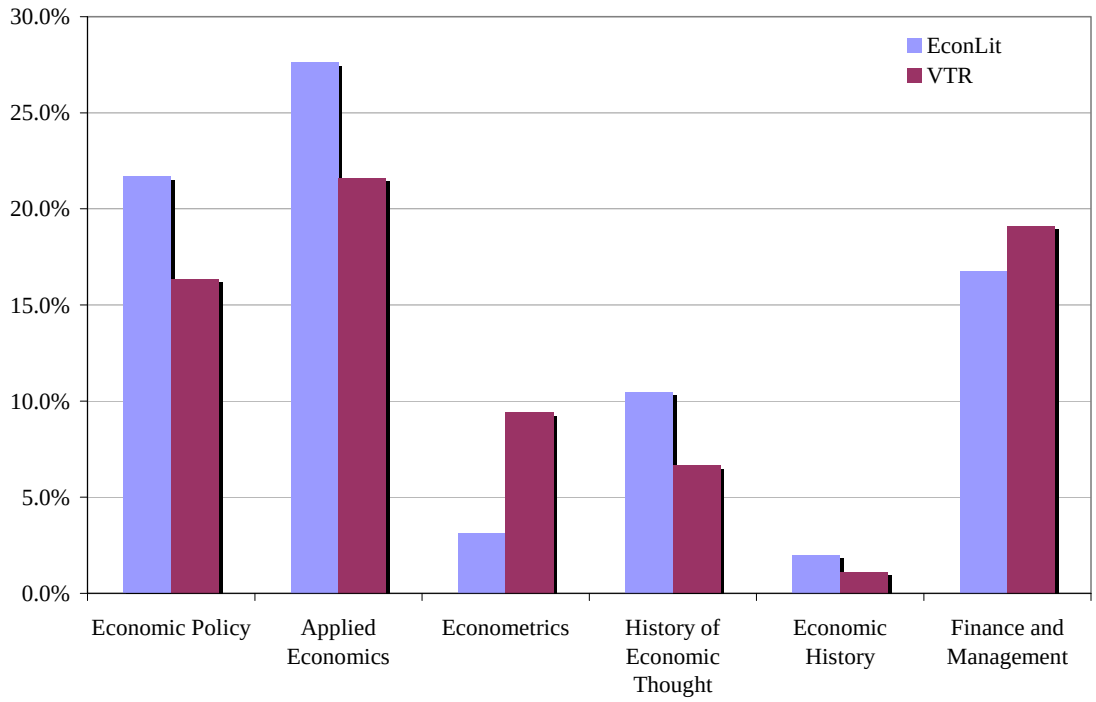
[24] The Journal of Economic Literature (JEL) codes are subject descriptors developed by the American Economic Association, widely used by authors to shortly denote the field and topic of their works. They are embodied in the EconLit database, and (together with the use of keywords) constitute the consensus classification system of the various branches of economics.

[25] As mentioned, within the VTR exercise different disciplines (namely "Economics", "Statistics and Operational Research" and "Business Administration") represent a unique unit of analysis – labelled "Area 13". Clearly, our sample of products denoted by JEL codes includes products falling into the "Economics" sub-area. Indeed, only 32% of products without the JEL code were submitted for "Economics", while 68% of them were submitted for the other disciplines. Within "Economics", a large share of these products is composed by books or book chapters.

[26] For instance, if we consider an article in labour economics presenting (according to its JEL codes) both theoretical and applied sections, following these criteria we assign it to both the *Applied Economics* and *Other* categories.

sample shows a lower share of products in Applied Economics, Economic Policy, History of Economic Thought, Economic History and Heterodox Approaches, and higher shares of Financial Economics, Business Economics and Management Studies, and in Econometrics and Quantitative Methods. The decrease of non-mainstream research fields, as well as of Economic History, appears sizeable in relative terms, as they respectively lose some34% and 44% of the shares exhibited in the EconLit dataset. Accordingly, a selection against these research areas seems to have occurred in the submission procedure, although the number of academics writing in these fields is quite high in Italy,[27] and their productivity (measured as number of publications per author) is not significantly different from mainstream economists [26]. As shown there, such a selection can be explained by a preference for the hypothetically most internationally visible products: in the case of Economics, this means a preference for mainstream quantitative publications (preferably, articles in high-IF journals).

Figure 1. Composition of the datasets by field



Description: The sub-samples of publications providing at least one JEL code are compared. Publications with more than one JEL code are assigned simultaneously to all the relevant fields. The figure does not include the "Other" field (87.8% of entries in the EconLit sub-sample and 83.7% in the VTR one).

But are there systematic differences in visibility among different publications' typologies, and, if any, are they relevant? In what follows, we present an exercise aimed at verifying how publications' visibility is related to the place of publication and to other characteristics, such as typology, Impact Factor (if any), field and number of authors. The purpose is twofold: on the one hand, we aim at exploring, from a descriptive viewpoint, the degree of international

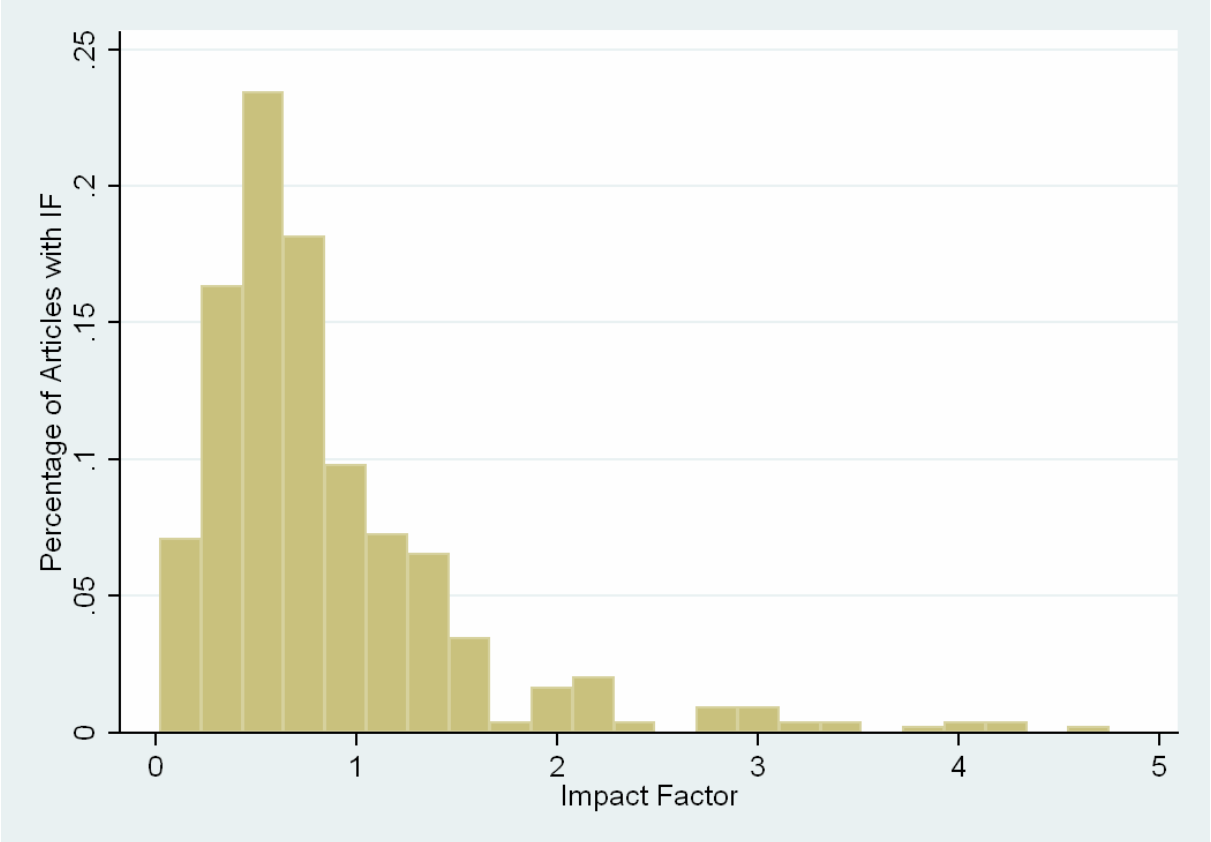
[27] By using the EconLit dataset, it is possible to classify Italian economists according to the fields they have published in (provided that they published *at least* one product in the sub-discipline). According to the latter criterion, the composition appears as follows: Other 98,8%, Economic Policy 66%, Applied Economics 70,5%, Financial and Business Economics 53,3%, History of Economic Thought 33,7%, Heterodox Approaches 23,3%, Econometrics and Quantitative Methods 23,2% and Economic History 18,6%. It seems evident that, although minority, in the 2001-03 period the economists who wrote at least once in History of Economic Thought or Heterodox Approaches were about *one third* and *one fourth* of the total.

visibility of publications, conditional to their characteristics; on the other hand, we propose a ranking methodology based on the number of citations, taking into account field-normalisation (as proposed by Van Leeuwen et al. [27]; Van Raan [3]). The proposal, described in the next section, aims at suggesting a quantitative criterion suitable to inform peer reviews, with a view to future research assessments.

The measure of external visibility of publications here investigated is the number of citations. This choice is usually justified by observing that influential research is necessarily cited by authors doing research in the same field. Accordingly, we count the number of citations recorded by the Google Scholar search engine (as of 30 July 2007) for all the products submitted to the VTR. Even if rough,[28] to our purposes this measure conveys more information than the usual *ISI – Web of Sciences* database, insofar as product typologies other than articles are thereby considered (namely, books and book chapters).

For all the articles submitted to VTR, Figures 2a and 2b compare the distribution of individual citations, as recorded by the Google Scholar (we label this number as Google Factor, or GF), with the distribution of the Impact Factor (IF) associated to their publication outlet (thus, products published on typologies with no IF are excluded). It appears evident that the distribution of the IF exhibits a peculiar log-normal shape, a result substantially unfamiliar in the field of bibliometrics. Instead, the number of individual citations (Google Factor) received by the same articles exhibits the more common power-law distribution [28, 29]: this evidence suggests that the sample of articles is not random with respect to the IF (detailed statistics are provided in Appendix B, Tables 3 and 4).

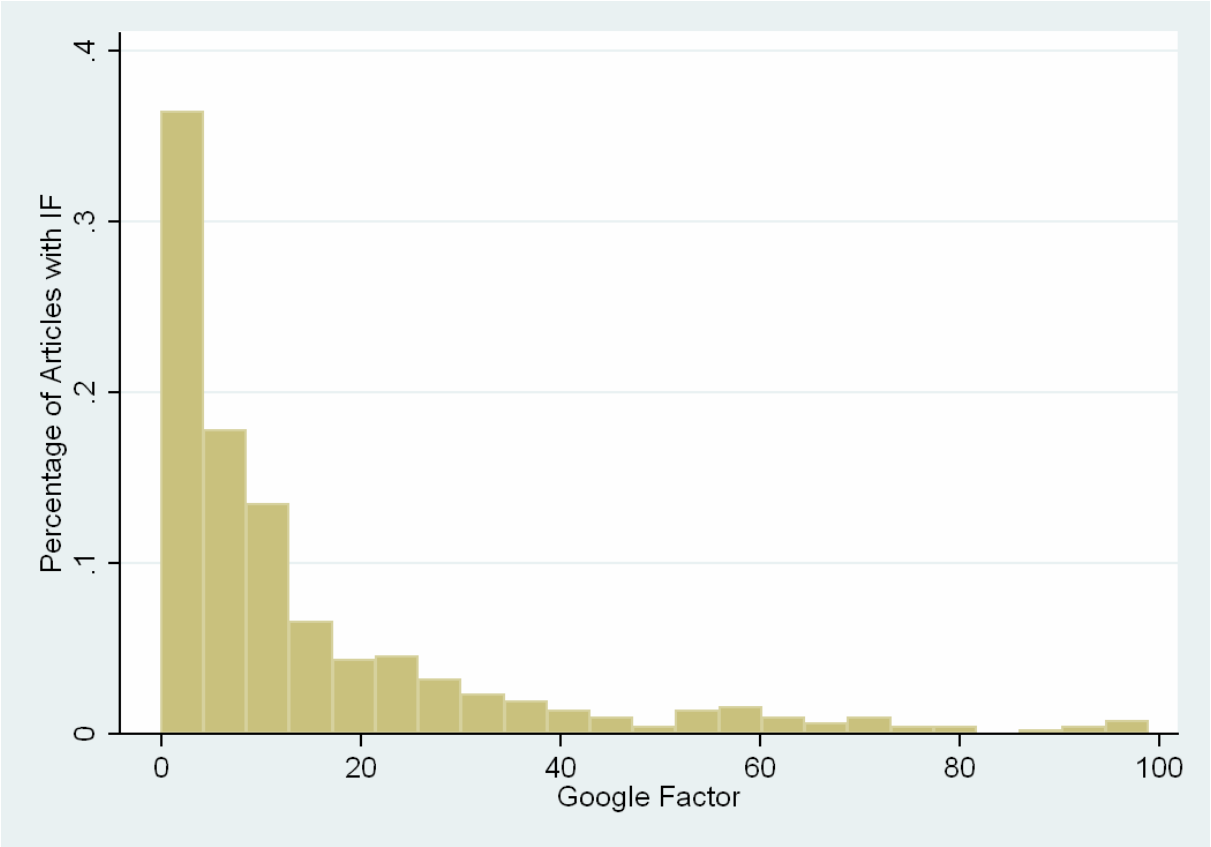
Figure 2a. Distribution of articles by Impact Factor



Description: Only articles published in IF journals are considered

[28] In particular, it does not account for self-citations and does not weigh citations according to the relevance of the citing publication.

Figure 2b. Distribution of articles by Google Factor

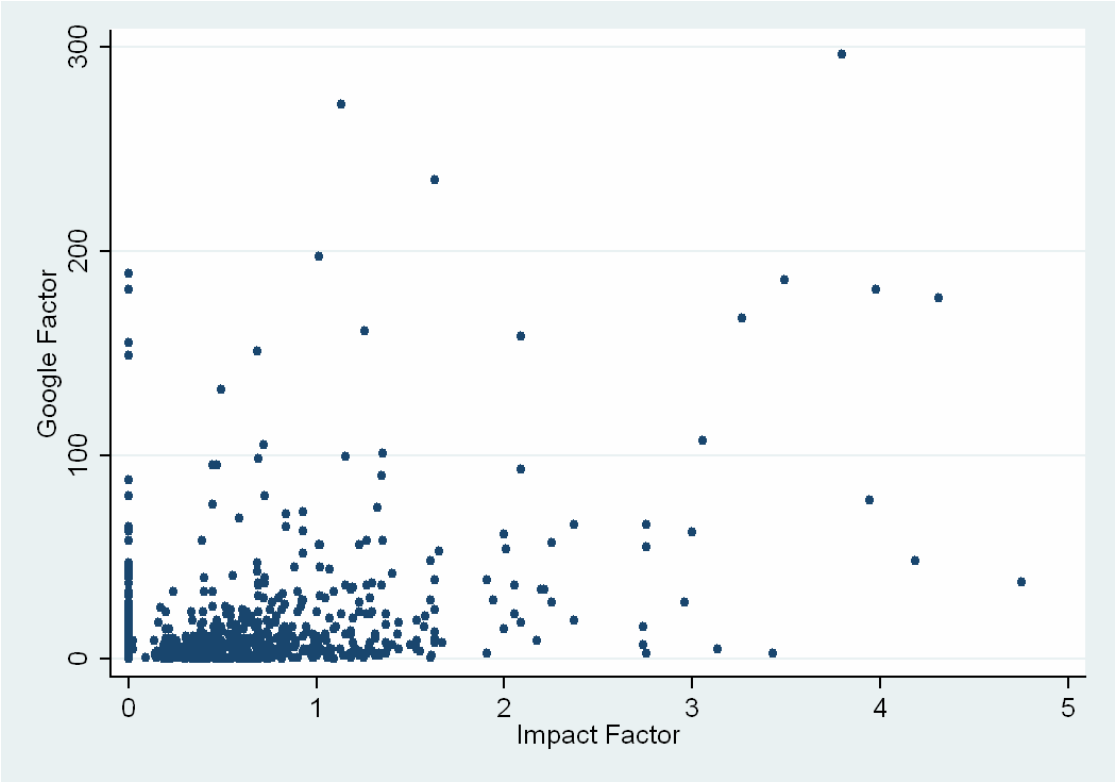


Description: Only articles published in IF journals are considered

When considering only articles published in IF-journals, the IF and the GF are indeed positively correlated (the Pearson correlation coefficient is 0.48), but this correlation explains only a small fraction of the total variance. This appears as clearer if we consider the totality of articles, as shown in Figures 3a and 3b (where a "zero" IF was assigned to articles published in journals not rated by the *ISI – Web of Sciences*). It is worth noting that many articles published in IF-journals (37 out of 552, or 6.7%) received no citations after four years (the issue emphasised by Oswald [18]). Conversely, several articles published in journals without an IF were largely cited. This evidence casts some doubts on the use of the IF as a (formal or informal) assessment criterion, reinforcing the notes of caution introduced in the previous section.

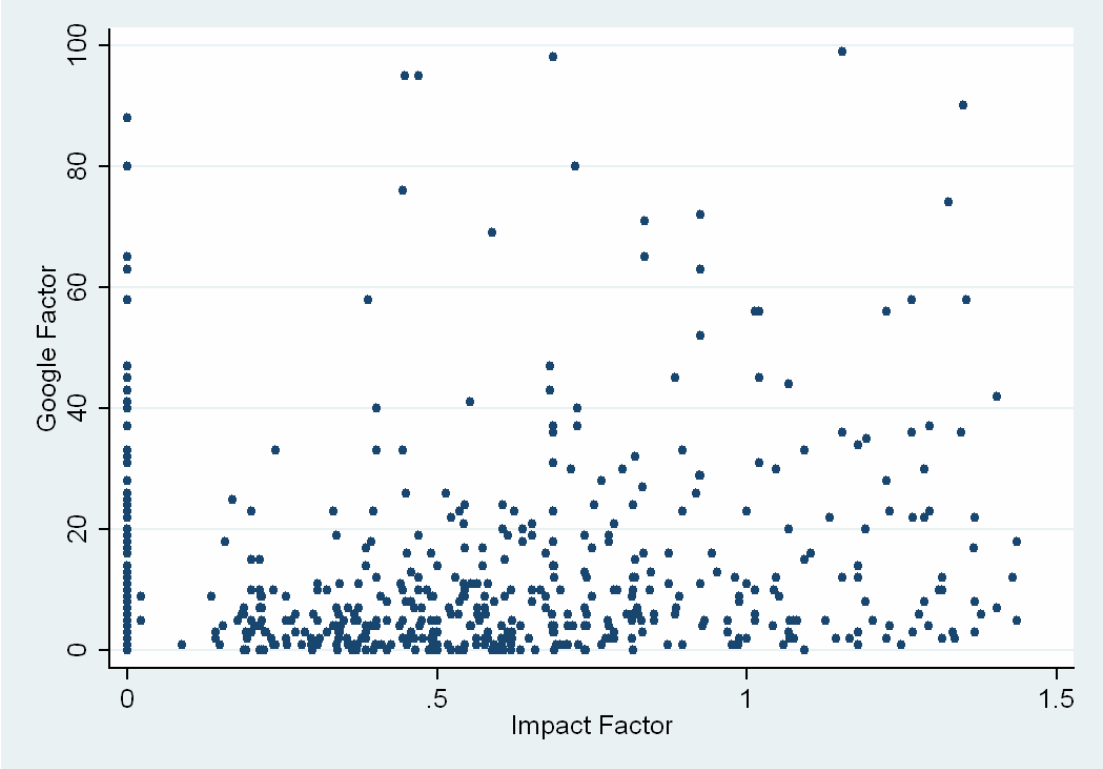
To investigate this evidence in greater detail, we estimated a structural model of publications' citations. The number of individual citations (GF index) was estimated through a Poisson count regression against a number of control variables, including the IF and a number of dummy variables, to control for product typology, the year of publication, the size of the research institution, the number of authors, and the field (alternatively summarized either by the 8 categories or by the first letter of the JEL codes). The main results are reported in Appendix B, Table 1.

Figure 3a. Google Factor plotted against Impact Factor



Description: the whole VTR sample is considered.

Figure 3b. Google Factor plotted against Impact Factor



Description: VTR sample; publications with GF lower than 100 and IF lower than 1.5 are considered.

When considering the whole VTR sample, it emerges, as it was expected, that more recent publications obtain on average more citations, as well as co-authored ones. Moreover, publications in Economics (together with those in Sociology and Anthropology) appear as more cited than those in Management Studies and Statistics. Not surprisingly, when considering the publication typology, book chapters appear the least cited, followed by books and journal articles without IF, while articles in IF journals exhibit on average more citations. This evidence is confirmed when the sample is restricted to journal articles only: as expected, a positive and statistically significant correlation emerges between the number of individual citations and the journal's IF.
We then restricted the sample to publications in Economics exhibiting a JEL code, in order to verify if systematic differences among disciplinary fields are maintained after controlling for observable regressors. In detail, even after controlling for the IF, it appears that publications in Applied Economics, Economic Policy, Financial and Business Economics, and Other show on average a higher number of citations, while, unsurprisingly, a lower number is attained by Economic History, Heterodox Economics and History of Economic Thought (more detailed evidence, disaggregated by one-digit JEL codes, is provided in Appendix B, Table 5).
In our view this result does not mean that a ranking among different research fields does exist: in fact, this evidence can well be explained by the existence of peculiar citation habits within different fields, and by the relative dimension of the respective research communities. In our opinion, taking into account this aspect is essential in order to provide a correct and neutral assessment of research products in Economics. In the following section we will go in further detail on this topic.

5. Proposal for a theory-neutral quantitative indicator

We assume that properly designed bibliometric indicators can represent a strong support tool to peer reviews [3, 30, 31].
The use of such indicators in the field of economics is now widespread (compare for example Kalaitzidakis et al. [32, 33], Lubrano et al. [34]). However, the literature on the subject is usually devoted to the refinement of statistical techniques aimed at developing a-priori "best" indicators perhaps overlooking, with some exceptions (e.g. Lee et al. [35]), the underlying implications for research development, which instead represent our main concern.
According to the previous analyses, we strongly support the view that citations-based indicators should refer to single articles and not to journals. Moreover, the importance of field-normalisation of citations count appears crucial [3, 27]: papers should be evaluated relatively to other papers in the same discipline, since the absolute number of citations is in most cases irrelevant, due to field-specific citation habits (for instance, articles dealing with econometric and statistical methodologies are likely to be cited transversally by applied studies in different fields, thus obtaining a higher average number of citations than articles covering field-specific research areas).
Following these theoretical considerations, we propose a ranking of research products in economics by looking at the number of citations received by each publication *in comparison with* other products in the same sub-discipline. In order to provide a classification of research areas within Economics, we chose to take into account JEL codes, due to their wide diffusion as an instrument of self-classification by the authors of academic papers in scholarly journals. In first approximation, as we did in the previous section, we decided to classify research

products by accounting for the first letter of the JEL code or, conversely, by aggregating JEL codes into eight sub-categories (see Section 4 for details).[29]
As for the number of citations, the Google Factor (number of citations recorded by the Google Scholar search engine) has been used due to its wide coverage (including, in principle, also book and book chapters) and its easy availability; however, in view of the application of this indicator in a formal research assessment, self-citations should be excluded.
Given this set-up, we propose two families of indicators, that could be referred to, respectively, as "descriptive" and "model-based". In the first case, we simply standardised the number of citations received by each research product by dividing this quantity by the mean or the median number of citations (see Tables 3 and 4) received by all the products in the specific sub-discipline[30] (in our case, within the VTR sample).[31] It should be noted that, since citations usually present a skewed distribution, dividing by the median probably represents a more robust choice. In symbols, these indicators can be expressed as:

$$V^1_{p,s} = \frac{G_p}{median(G_s)}$$

and

$$V^2_{p,s} = \frac{G_p}{mean(G_s)},$$

where p identifies the publication, s identifies the corresponding sub-discipline and G is the number of citations according to Google Scholar. Clearly, a value higher than one means that the specific publication outperformed the average of citations in the same research area.
In the second case, we took as a benchmark the regression estimates of individual citations presented in Tables 1 and 5. For each research product,we then calculated the difference between the actual number of citations and the predicted one. We can express this indicator as:

$$V^3_p = G_p - \hat{G}_p,$$

where $\hat{G}$ is the predicted number of individual citations estimated through the Poisson count model.
According to this approach, research products being cited more than their expected value (conditional on their characteristics), i.e. presenting a higher-than-average visibility, take on a positive value; the opposite occurs for products receiving lower-than-average citations.
Finally, we developed a number of alternative institutions' rankings, so as to assess the potential impact of our proposed indicators. For each institution, we averaged the scores obtained by the research products submitted to the VTR on the three indicators. As it was

[29] It is worth noting that books and book chapters are rarely provided with JEL codes: therefore, a feasible application of this methodology in future research evaluation exercises (in order to prevent an under-representation of these typologies) would require an indirect assignment of the corresponding JEL codes by the authors of such products themselves, where they are not explicitly provided.
[30] It seems important to remark that, in our approach, when a research product presented more than one JEL code (or belonged to more than one research area, in our taxonomy), the mean or median number of citations at the denominator of the ratio has been averaged over the research areas in question, i.e. all available JEL codes have been considered for rating purposes. Of course, other criteria are possible, for example to consider the first JEL code as representative of the publication's main research field.
[31] If data were available, the best strategy should be to standardise citation counts with respect to the scientific production of all economists in each field.

done in the VTR experiment, results are presented separately (Appendix B, Table 6) according to the size of the institution (mega, large, medium and small institutions). It is important to remark that these rankings are only suggestive, since in most cases only a sub-sample of the original VTR dataset could be used for their computation, since JEL codes are available only for publications in Economics (thus excluding Statistics and Management Sciences) and, mainly, for journal articles. Table 6 also shows a couple of model-based rankings obtained using respectively the full VTR sample and the sub-sample of articles, where all the controls included in our regressions except JEL codes have been used (thus, in these cases, field-normalisation has not been taken into account).
Crucially, rankings appear as highly sensitive to the methodology adopted. In particular, the upper and lower positions within each size class appear as substantially different from those identified by the official VTR ranking (presented in the first column of Table 6). This evidence suggests that using bibliometric indicators of this kind *alone* does not appear a viable policy option; however, using them *alongside* traditional peer review methodologies may assist the activity of referees and lead to more reliable outcomes.

6. Conclusions

The assessment of research in Economics and, more generally, in the social sciences, raises relevant concerns for the preservation of pluralism in these disciplines. The Italian case clearly shows how incorrectly designed evaluation methodologies, relying on unclear (or even biased) guidelines and failing to establish accountability and transparency, may disproportionately harm minority disciplines, shaping economic research in the direction of those fields which are likely to obtain higher ratings in the assessment exercises.
The analysis carried out in the previous sections highlighted the potential inadequacy of evaluation criteria based on supposedly shared value scales (and on the international visibility of research products) in such a multiform discipline as Economics. In particular, we showed that some branches of Economics, namely those which do not conform to the mainstream paradigm, may be strongly hurt by peer-review evaluation and ex-post funding based on the rigid application of these criteria, especially if corroborated by the use of journal rankings (possibly based on Impact Factors) as auxiliary documentation.
The empirical analysis carried out in the paper seems to confirm, to a certain extent, the above-mentioned criticisms. In the Italian case, a selection process against non-mainstream disciplines occurred in the submission of products to the assessment exercise, with the consequence that final rankings cannot be considered representative of the actual distribution of economic research by topic. Moreover, our findings point at the misuse of the Impact Factor (not explicitly included in the evaluation guidelines, but admittedly used by some referees) as an evaluation device, with negative consequences, again, on heterodox disciplines (which fail to achieve sufficient visibility on high IF journals).
As a response to these findings, the last section of the paper proposes simple quantitative indicators of "visibility" based on individual citations count (as opposed to journals' IF) and, crucially, on field-normalisation (that is, by taking into account the specificities of each sub-discipline). We strongly suggest the utilisation of this kind of indicators, whose computation is nowadays made straightforward by the availability and accessibility of large datasets of publications, as a "companion" to peer review assessments. In this sense, the subjectivity of peers' ratings (potentially affected by conflicts of interest and poor transparency) could be mitigated through the reliance on quantitative indicators, while, at the same time, the rigidity of these indicators could be relieved by individual appraisals.

In practical terms, we could imagine a framework where a referee is asked to justify a negative rating, if it is not supported by field-normalised bibliometric indicators (i.e. if the publication shows a number of citations significantly higher than the average for that sub-discipline), or vice versa in case of a positive rating. This approach undoubtedly raises the overall complexity of evaluations, but in our opinion it is naive to treat a complex issue as the assessment of research in social sciences (entailing potentially heavy repercussions on the whole society) with simple instruments.
More generally, we invoke a proper design of research evaluation systems, based on clear and shared guidelines and on the necessary inclusion of pluralism in the objective function of evaluators. The prospect of our discipline – Economics – is at stakes.

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Appendix A – Classification of research products

Research products were allocated according to the following criteria, based on the JEL classification system.

Applied Economics, the following JEL codes: C9, C90, C91, C92, C93, C99, L6, L60, L61, L62, L63, L64, L65, L66, L67, L68, L69, L7, L70, L71, L72, L73, L74, L78, L79, L8, L80, L81, L82, L83, L84, L85, L86, L87, L88, L89, L9, L90, L91, L92, L93, L94, L95, L96, L97, L98, L99, O5, O50, O51, O52, O53, O54, O55, and the whole categories R and P.

Economic Policy, the following JEL codes: D18, F13, F33, F34, F35, F42, I18, I28, I38, L52, L53, L59, 02, 020, 021, 022, 023, 024, 029, J18, J28, J38, J48, J58, J68, J78, J88, 038, Q18, Q28, Q38, Q48, E5, E50, E51, E52, E58, E59, E6, E60, E61, E62, E63, E64, E65, E66, E69, L4, L40, L41, L42, L43, L44, L49, L5, L50, L51.

Heterodox Economics, the following JEL codes: B5, B50, B51, B52, B53, B59,E11, E12, D57, B5, B50, B51, B52, B53, B59, E11, E12, D57.

Econometrics and Quantitative Methods: all the JEL codes included under the letter C, with the exception of C7, C70, C71, C72, C73, C78.

Economic History: all the JEL codes included under the letter N.

History of Economic Thought: all the JEL codes included under the letter B.

Corporate Finance and Management: all the JEL codes included under the letters G and M.

The residual category **Other** was created, including the following JEL codes: C7, C70, C71, C72, C73, C78, L10, L11 , L12 , L13 , L14 , L15 , L16 , L17 , L18 , L19 , L1, L20, L21, L22, L23, L24, L25, L26, L27, L28, L29, L2, L30, L31, L32, L33, L34, L35, L36, L37, L38, L39, L3, O10, O11, O12, O13, O14, O15, O16, O17, O18, O19, O1, O40, O41, O42, O43, O44, O45, O46, O47, O48, O49, O4, O30, O31, O32, O33, O34, O35, O36, O37, O38, O39, O3, as well as the whole categories A, D, E, F, H, I, J, K, and Z.

Appendix B – Tables

Table 1. Determinants of Google Factor: main results [a]

	All Sample	**Articles Only**		**Economics Only**		
Number of Authors	0.197***	0.254***	-0.160***	0.428***	0.451***	0.283***
	(0.005)	*(0.005)*	*(0.009)*	*(0.016)*	*(0.016)*	*(0.017)*
Impact Factor			0.463***			0.573***
			(0.009)			*(0.010)*
Book Chapter	-1.447***			-2.033***		
	(0.083)			*(0.132)*		
Journal Article without IF	-0.019			-1.017***		
	(0.042)			*(0.071)*		
Journal Article with IF	0.979***			-0.306***		
(Reference case: books)	*(0.031)*			*(0.059)*		
Year 2002	-0.119***	0.006	0.058**	0.053**	0.077***	-0.006
	(0.021)	*(0.022)*	*(0.023)*	*(0.027)*	*(0.028)*	*(0.028)*
Year 2003	-0.643***	-0.569***	-0.368***	-0.533***	-0.495***	-0.393***
(Reference case: 2001)	*(0.022)*	*(0.024)*	*(0.025)*	*(0.030)*	*(0.031)*	*(0.031)*
Medium-Sized Research Centre (10 to 24 products)	-0.01	0.204***	0.091**	-0.105**	-0.017	-0.056
	(0.034)	*(0.04)*	*(0.04)*	*(0.051)*	*(0.051)*	*(0.052)*
Large Research Centre (25 to 74 products)	0.219***	0.528***	0.345***	0.084	0.215***	0.093*
	(0.035)	*(0.040)*	*(0.040)*	*(0.052)*	*(0.051)*	*(0.052)*
Very Large Research Centre (75 or more products)	-0.745***	-0.293***	-0.247***	-0.489***	-0.282***	-0.141*
(Reference case: small research centres)	*(0.051)*	*(0.055)*	*(0.055)*	*(0.077)*	*(0.076)*	*(0.077)*
Management Studies	-0.221***	-0.151***	-0.108***			
	(0.030)	*(0.031)*	*(0.031)*			
Statistics	-0.477***	-0.601***	-0.613***			
	(0.024)	*(0.025)*	*(0.027)*			
Sociology and Antropology	-0.020	0.126*	0.399***			
(Reference case: economics)	*(0.071)*	*(0.072)*	*(0.072)*			
Economic Policy				0.265***	-0.781***	0.238***
				(0.029)	*(0.142)*	*(0.029)*
Applied Economics				0.222***	-1.602***	0.216***
				(0.027)	*(0.143)*	*(0.029)*
Econometrics & Quantitative Methods				-0.212***	0.195***	-0.079
				(0.047)	*(0.028)*	*(0.049)*
Economic History				-0.815***	0.272***	-0.466***
				(0.142)	*(0.029)*	*(0.142)*
History of Economic Thought				-0.995***	-1.572***	-1.377***
				(0.112)	*(0.184)*	*(0.144)*
Heterodox Economics				-1.241***	-0.255***	-1.226***
				(0.162)	*(0.048)*	*(0.184)*
Financial and Business Economics				0.128***	0.282***	0.066**
				(0.029)	*(0.040)*	*(0.030)*
Other				0.330***	0.099***	0.257***
				(0.040)	*(0.029)*	*(0.041)*
Constant	1.903***	2.298***	2.771***	2.517***	2.025***	1.847***
	(0.044)	*(0.041)*	*(0.042)*	*(0.089)*	*(0.070)*	*(0.071)*
Observations	1007	717	717	361	330	330
Pseudo R-squared	0.22	0.13	0.24	0.23	0.18	0.35

[a] Poisson count regression. Dependent variable: number of citations on Google Scholar at July 2007. Standard errors in parentheses. Estimation period: 2001-2003.
* Significant at 10%; ** significant at 5%; *** significant at 1%.

Table 2. EconLit and VTR datasets: descriptive statistics [a]

	EconLit		**VTR**		**VTR (Economics only)**	
	n	**%**	**n**	**%**	**n**	**%**
Books	110	4.1%	188	18.7%	90	15.1%
Book Chapters	634	23.4%	102	10.1%	70	11.7%
Articles	1965	72.5%	717	71.2%	437	73.2%
Total	**2709**	**100.0%**	**1007**	**100.0%**	**597**	**100.0%**

[a] Source: EconLit and VTR (Area 13) databases.

Table 3. Impact Factor and Google Factor: descriptive statistics [a]

	Number	*Mean*	*Median*	*Std.Dev.*	*Skewness*	*Min*	*Max*	*5%*	*95%*
	Impact Factor								
Applied Economics	56	0.875	0.6865	0.643	3.051	0.217	4.312	0.236	2.087
Economic Policy	47	0.898	0.723	0.757	2.165	0.089	3.795	0.2	3
Other	230	0.887	0.7045	0.716	2.344	0.089	4.756	0.2	2.196
Heterodox Economics	5	0.501	0.444	0.124	0.699	0.403	0.688	0.403	0.688
Econometrics	27	0.78	0.62	0.531	1.995	0.222	1.315	0.24	1.315
Economic History	4	0.644	0.674	0.264	-0.373	0.297	0.929	0.297	0.929
History of Ec. Thought	10	0.48	0.301	0.477	1.111	0.022	1.333	0.022	1.333
Finance & Management	49	1.101	0.806	0.823	1.443	0.135	3	0.272	3.494
	Google Factor								
Applied Economics	78	25.846	9	43.138	3.431	0	272	0	93
Economic Policy	59	27.203	10	47.764	3.808	0	296	0	80
Other	302	23.139	9	40.431	3.704	0	296	0	93
Heterodox Economics	12	3.25	2.5	2.8	1.134	0	10	0	10
Econometrics	34	17.206	7.5	20.095	1.475	0	69	1	69
Economic History	4	12.75	4.5	18.209	1.138	2	40	2	40
History of Ec. Thought	24	3.5	1.5	6.84	3.551	0	33	0	9
Finance & Management	69	27.623	12	39.149	2.356	0	186	0	101
	Google Factor - Articles only								
Applied Economics	68	27.132	10.5	44.817	3.41	0	272	0	93
Economic Policy	56	28.464	11	48.719	3.714	0	296	0	80
Other	275	23.96	10	40.959	3.729	0	296	0	95
Heterodox Economics	9	3.333	2	3	1.339	1	10	1	10
Econometrics	34	17.206	7.5	20.095	1.475	0	69	1	69
Economic History	4	12.75	4.5	18.209	1.138	2	40	2	40
History of Ec. Thought	20	2.5	2	2.856	1.147	0	9	0	9
Finance & Management	62	27.258	12	37.232	2.449	0	186	0	98
	Google Factor - Articles with Impact Factor only								
Applied Economics	56	31.179	14	48.237	3.103	0	272	0	151
Economic Policy	47	29.404	12	46.478	4.187	0	296	1	76
Other	230	26.504	11	42.542	3.567	0	296	1	95
Heterodox Economics	5	3.2	3	1.924	0.396	1	6	1	6
Econometrics	27	19.593	8	21.855	1.16	0	69	1	69
Economic History	4	12.75	4.5	18.209	1.138	2	40	2	40
History of Ec. Thought	10	3.7	3	3.268	0.664	0	9	0	9
Finance & Management	49	33.327	19	39.68	2.169	0	101	1	186

[a] Source: VTR (Area 13) database. Only products provided with at least one JEL code are considered.

Table 4. Impact Factor and Google Factor: disaggregated descriptive statistics [a]

	Number	*Mean*	*Median*	*Std.Dev.*	*Skewness*	*Min*	*Max*	*5% perc.*	*95%*
	Impact Factor								
A - General Economics	0								
B - Economic Thought	10	0.301	0.48	0.477	1.11	0.022	1.333	0.022	1.333
C - Quantitative Methods	30	0.775	0.62	0.509	1.981	0.222	2.737	0.24	1.355
D - Microeconomics	91	0.91	0.69	0.732	2.508	0.142	4.756	0.213	2.25
E - Macroeconomics	62	0.86	0.69	0.775	2.552	0.17	4.312	0.189	2.25
F - International Economics	36	1.004	0.8645	0.825	1.889	0.089	3.795	0.135	3.494
G - Financial Economics	46	1.097	0.786	0.845	1.431	0.135	3.494	0.272	3
H - Public Economics	35	0.894	0.786	0.866	2.798	0.189	4.756	0.213	2.087
I - Health, Education, Welfare	5	0.382	0.455	0.176	-0.207	0.179	0.579	0.179	0.579
J - Labour Economics	31	0.909	0.544	0.839	1.593	0.179	3.058	0.2	3
K - Law & Economics	8	0.613	0.562	0.28	0.247	0.297	1.021	0.297	1.021
L - Industrial Organization	49	0.749	0.653	0.425	1	0.192	2.052	0.215	1.631
M - Business Administration	5	1.457	1.021	1.088	1.05	0.545	3.267	0.545	3.267
N - Economic History	4	0.644	0.674	0.264	-0.373	0.297	0.929	0.297	9.929
O - Economic Development	51	0.923	0.738	0.702	2.34	0.17	4.312	0.189	1.909
P - Economic Systems	11	1.095	0.688	1.163	2.166	0.217	4.312	0.217	4.312
Q - Agric. & Environmental	12	0.63	0.397	0.407	0.504	0.213	1.23	0.213	1.23
R - Regional Economics	25	0.916	0.926	0.462	1.066	0.217	2.087	0.217	2.087
Z - Special Topics	4	0.943	1.074	0.32	-1.031	0.472	1.154	0.472	1.154
	Google Factor								
A - General Economics	0								
B - Economic Thought	24	3.5	1.5	6.84	3.551	0	9	0	33
C - Quantitative Methods	38	17	7.5	19.574	1.439	0	69	1	69
D - Microeconomics	119	19.899	10	27.912	2.832	0	167	0	72
E - Macroeconomics	78	23.602	6.5	45.878	3.869	0	296	0	80
F - International Economics	47	30.872	14	55.71	3.295	0	296	0	186
G - Financial Economics	61	28.197	11	40.931	2.304	0	186	0	101
H - Public Economics	43	21.86	11	30.089	2.718	0	155	1	93
I - Health, Education, Welfare	9	5.667	5	4.69	0.724	0	15	0	15
J - Labour Economics	47	20.766	6	35.775	3.152	0	197	0	95
K - Law & Economics	10	28.4	13.5	34.475	0.989	1	95	1	95
L - Industrial Organization	66	16.545	7	28.67	3.888	0	189	0	72
M - Business Administration	10	37	24.5	49.822	1.929	0	167	0	167
N - Economic History	4	12.75	4.5	18.209	1.138	2	40	2	40
O - Economic Development	73	22.589	10	39.276	3.615	0	235	0	88
P - Economic Systems	18	22.056	5	42.12	2.995	0	177	0	177
Q - Agric. & Environmental	14	10.286	4.5	10.971	0.803	0	33	0	33
R - Regional Economics	34	33.735	11	54.632	2.876	0	272	0	151
Z - Special Topics	7	84.286	7	110.296	0.817	4	272	4	272

[a] Source: VTR (Area 13) database. Only products provided with at least one JEL code are considered.

Table 5. Determinants of Google Factor: disaggregated results [a]

	I	**II**	**III**
Number of Authors	0.436***	0.496***	0.297***
	(0.016)	*(0.016)*	*(0.018)*
Impact Factor			0.592***
			(0.012)
Book Chapter	-2.311***		
	(0.136)		
Journal Article without IF	-1.187***		
	(0.076)		
Journal Article with IF	-0.420***		
	(0.064)		
Year 2002	0.018	0.066**	-0.014
	(0.028)	*(0.029)*	*(0.030)*
Year 2003	-0.578***	-0.540***	-0.404***
(Reference case: 2001)	*(0.032)*	*(0.032)*	*(0.033)*
Medium-Sized Research Centre (10 to 24 products)	0.073	0.120**	0.124**
	(0.052)	*(0.052)*	*(0.053)*
Large Research Centre (25 to 74 products)	0.287***	0.407***	0.285***
	(0.053)	*(0.052)*	*(0.053)*
Very Large Research Centre (75 or more products)	-0.405***	-0.222***	0.065
(Reference case: small research centres)	*(0.078)*	*(0.077)*	*(0.078)*
B - Schools of Economics Thought, Methodology	-1.147***	-1.753***	-1.454***
	(0.113)	*(0.144)*	*(0.144)*
C - Mathematical and Quantitative Methods	-0.347***	-0.493***	-0.241***
	(0.046)	*(0.047)*	*(0.048)*
D – Microeconomics	0.044	-0.055*	-0.080***
	(0.027)	*(0.028)*	*(0.028)*
E - Macroeconomics and Monetary Economics	0.121***	0.163***	0.113***
	(0.030)	*(0.031)*	*(0.032)*
F - International Economics	0.541***	0.603***	0.379***
	(0.031)	*(0.032)*	*(0.033)*
G - Financial Economics	0.089***	-0.065**	-0.119***
	(0.031)	*(0.033)*	*(0.035)*
H - Public Economics	-0.122***	-0.275***	-0.354***
	(0.038)	*(0.041)*	*(0.043)*
I - Health, Education, and Welfare	-0.895***	-0.931***	-0.537***
	(0.144)	*(0.163)*	*(0.164)*
J - Labor and Demographic Economics	-0.042	-0.180***	-0.145***
	(0.038)	*(0.038)*	*(0.039)*
K - Law and Economics	0.424***	0.369***	0.688***
	(0.064)	*(0.064)*	*(0.065)*
L - Industrial Organization	-0.545***	-0.599***	-0.347***
	(0.037)	*(0.039)*	*(0.040)*
M - Business Administration and Business Ec.	0.524***	0.883***	0.517***
	(0.061)	*(0.062)*	*(0.063)*
N - Economic History	-1.004***	-0.973***	-0.629***
	(0.143)	*(0.143)*	*(0.144)*
O - Economic Development, Technical Change	0.105***	0.094***	0.106***
	(0.031)	*(0.031)*	*(0.032)*
P - Economic Systems	0.191***	0.129**	-0.235***
	(0.054)	*(0.055)*	*(0.060)*
Q – Agricultural, Environmental, Ecological Ec.	-0.708***	-0.681***	-0.393***
	(0.086)	*(0.087)*	*(0.087)*
R - Urban, Rural, and Regional Economics	0.289***	0.357***	0.445***
	(0.035)	*(0.036)*	*(0.038)*
Z - Other Special Topics	1.552***	1.439***	1.553***
	(0.051)	*(0.052)*	*(0.053)*
Constant	2.728***	2.082***	1.892***
	(0.093)	*(0.068)*	*(0.070)*

Observations	361	330	330
Pseudo R-squared	0.32	0.30	0.46

[a] Poisson count regression. Dependent variable: number of citations on Google Scholar at July 2007. Standard errors in parentheses. Estimation period: 2001-2003. * Significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6. Rankings of universities according to different methodologies

SIZE	RANKING METHODOLOGY				
	VTR OFFICIAL RANKING	GOOGLE FACT. STD. 1 (using mean citations)		GOOGLE FACT. STD. 2 (using median citations)	
MEGA	ROMA SAPIENZA	ROMA SAPIENZA	0.74	ROMA SAPIENZA	1.78
LARGE	MILANO BOCCONI	MILANO BOCCONI	1.91	SIENA	5.68
LARGE	BOLOGNA	SIENA	1.66	MILANO BOCCONI	5.61
LARGE	SIENA	TORINO	1.22	TORINO	3.41
LARGE	TORINO	BOLOGNA	1.01	BOLOGNA	2.49
LARGE	MILANO CATTOLICA	BARI	0.74	BARI	1.88
LARGE	NAPOLI FEDERICO II	FIRENZE	0.65	MILANO CATTOLICA	1.77
LARGE	FIRENZE	MILANO CATTOLICA	0.63	FIRENZE	1.55
LARGE	BARI	NAPOLI FEDERICO II	0.40	NAPOLI FEDERICO II	0.92
LARGE	CNR	CNR	0.12	CNR	0.46
MEDIUM	MODENA E REGGIO	ROMA TRE	2.73	ROMA TRE	6.99
MEDIUM	SALERNO	SALERNO	2.61	SALERNO	6.27
MEDIUM	VENEZIA CA' FOSCARI	MODENA E REGGIO	1.61	MODENA E REGGIO	4.37
MEDIUM	PAVIA	BERGAMO	1.18	PARMA	3.06
MEDIUM	PADOVA	PARMA	1.16	BERGAMO	2.81
MEDIUM	CHIETI E PESCARA	MILANO BICOCCA	1.16	MILANO BICOCCA	2.81
MEDIUM	URBINO CARLO BO	PADOVA	0.99	MILANO STATALE	2.47
MEDIUM	PIEMONTE ORIENTALE	VENEZIA CA' FOSCARI	0.93	PADOVA	2.28
MEDIUM	MILANO BICOCCA	CHIETI E PESCARA	0.86	VENEZIA CA' FOSCARI	2.26
MEDIUM	BERGAMO	MILANO STATALE	0.86	CHIETI E PESCARA	2.25
MEDIUM	TRENTO	PAVIA	0.73	PAVIA	1.81
MEDIUM	MILANO	CAGLIARI	0.67	CALABRIA	1.62
MEDIUM	ROMA TRE	PISA	0.65	PISA	1.41
MEDIUM	TRIESTE	CALABRIA	0.51	CAGLIARI	1.35
MEDIUM	PISA	POLITECNICA DELLE MARCHE	0.46	TRIESTE	1.21
MEDIUM	UDINE	TRIESTE	0.43	POLITECNICA DELLE MARCHE	1.17
MEDIUM	CALABRIA	CASSINO	0.43	VERONA	0.98
MEDIUM	BRESCIA	VERONA	0.41	CASSINO	0.88
MEDIUM	CAGLIARI	URBINO CARLO BO	0.38	URBINO CARLO BO	0.87
MEDIUM	PARMA	ROMA TOR VERGATA	0.31	NAPOLI PARTHENOPE	0.76
MEDIUM	PALERMO	GENOVA	0.30	ROMA TOR VERGATA	0.71
MEDIUM	CATANIA	CATANIA	0.30	BRESCIA	0.69
MEDIUM	LECCE	BRESCIA	0.29	CATANIA	0.68
MEDIUM	POLITECNICA DELLE MARCHE	PERUGIA	0.29	GENOVA	0.68
MEDIUM	VERONA	NAPOLI PARTHENOPE	0.29	PIEMONTE ORIENTALE	0.66
MEDIUM	PERUGIA	LECCE	0.26	LECCE	0.53
MEDIUM	CASSINO	PIEMONTE ORIENTALE	0.25	PERUGIA	0.53
MEDIUM	ROMA TOR VERGATA	PALERMO	0.23	TRENTO	0.50
MEDIUM	MESSINA	TRENTO	0.21	PALERMO	0.47
MEDIUM	GENOVA	MESSINA	0.14	MESSINA	0.29
MEDIUM	NAPOLI PARTHENOPE	UDINE	0.05	UDINE	0.11
SMALL	SASSARI	SASSARI	1.68	SASSARI	5.80
SMALL	LIUC CARLO CATTANEO	INSUBRIA	1.38	INSUBRIA	3.13
SMALL	BOLZANO	TERAMO	0.48	TERAMO	1.05
SMALL	LUMSA	NAPOLI SECONDA UNIV.	0.41	NAPOLI SECONDA UNIV.	0.85
SMALL	PISA S. ANNA	FERRARA	0.21	VENEZIA IUAV	0.71
SMALL	CAMERINO	VENEZIA IUAV	0.21	LIUC CARLO CATTANEO	0.64
SMALL	INSUBRIA	SANNIO	0.19	FERRARA	0.53
SMALL	MOLISE	LIUC CARLO CATTANEO	0.18	SANNIO	0.48
SMALL	SANNIO	LUISS GUIDO CARLI	0.08	LUISS GUIDO CARLI	0.20
SMALL	L'AQUILA	MOLISE	0.06	MOLISE	0.14
SMALL	TERAMO	L'AQUILA	0.06	L'AQUILA	0.13
SMALL	CUEIM	CUEIM	NA	MACERATA	NA
SMALL	VALLE D'AOSTA	CAMERINO	NA	PISA S. ANNA	NA
SMALL	POLITECNICO TORINO	BOLZANO	NA	POLITECNICO DI TORINO	NA
SMALL	NAPOLI SECONDA UNIV.	MACERATA	NA	VALLE D'AOSTA	NA
SMALL	LUISS	LUMSA	NA	TUSCIA	NA
SMALL	VENEZIA IUAV	NAPOLI ORIENTALE	NA	FOGGIA	NA
SMALL	FERRARA	TUSCIA	NA	LUMSA	NA
SMALL	FOGGIA	VALLE D'AOSTA	NA	CAMERINO	NA
SMALL	NAPOLI ORIENTALE	FOGGIA	NA	NAPOLI ORIENTALE	NA
SMALL	TUSCIA	CATANZARO	NA	CATANZARO	NA

SMALL	MACERATA	POLITECNICO DI TORINO	NA	BOLZANO	NA
SMALL	CATANZARO	PISA S. ANNA	NA	CUEIM	NA

Table 6 (continued). Rankings of universities according to different methodologies

SIZE	RANKING METHODOLOGY							
	MODEL-BASED, FULL SAMPLE		MODEL-BASED, ARTICLES ONLY		MODEL-BASED, ARTICLES WITH JEL CODE		MODEL-BASED, ARTICLES WITH JEL CODE (without controlling for IF)	
MEGA	ROMA SAPIENZA	4.44E-08	ROMA SAPIENZA	-3.46E-08	ROMA SAPIENZA	1.36E-07	ROMA SAPIENZA	-3.01E-07
LARGE	MILANO BOCCONI	16.57	MILANO BOCCONI	14.05	MILANO BOCCONI	16.73	MILANO BOCCONI	12.73
LARGE	SIENA	9.60	SIENA	7.47	SIENA	2.23	SIENA	11.95
LARGE	TORINO	2.33	TORINO	3.11	BARI	0.31	BOLOGNA	1.30
LARGE	BOLOGNA	-1.57	FIRENZE	-0.74	BOLOGNA	-1.60	TORINO	1.14
LARGE	MILANO CATTOLICA	-2.19	BOLOGNA	-2.30	TORINO	-1.80	MILANO CATTOLICA	-4.18
LARGE	FIRENZE	-2.29	BARI	-2.99	FIRENZE	-2.83	FIRENZE	-4.48
LARGE	BARI	-4.30	MILANO CATTOLICA	-3.21	MILANO CATTOLICA	-5.76	NAPOLI FEDERICO II	-5.47
LARGE	CNR	-9.13	NAPOLI FEDERICO II	-13.04	NAPOLI FEDERICO II	-6.98	BARI	-8.64
LARGE	NAPOLI FEDERICO II	-10.36	CNR	-13.89	CNR	-23.04	CNR	-27.81
MEDIUM	SALERNO	31.19	ROMA TRE	30.09	ROMA TRE	42.40	ROMA TRE	52.39
MEDIUM	ROMA TRE	28.69	SALERNO	27.14	SALERNO	19.25	SALERNO	30.64
MEDIUM	CHIETI E PESCARA	12.41	MODENA E REGGIO	15.01	PARMA	12.66	PARMA	15.11
MEDIUM	PADOVA	10.13	CHIETI E PESCARA	10.06	MODENA E REGGIO	6.91	BERGAMO	4.67
MEDIUM	MODENA E REGGIO	6.91	CATANIA	6.85	CHIETI E PESCARA	4.74	MODENA E REGGIO	4.60
MEDIUM	PAVIA	5.02	PADOVA	6.66	PERUGIA	3.50	PADOVA	1.61
MEDIUM	MILANO STATALE	3.28	PAVIA	2.67	BERGAMO	3.41	PISA	1.04
MEDIUM	PARMA	2.95	BERGAMO	2.16	PADOVA	1.66	CHIETI E PESCARA	0.43
MEDIUM	CATANIA	2.04	TRIESTE	1.12	CASSINO	1.18	PERUGIA	0.24
MEDIUM	MILANO BICOCCA	1.66	MILANO STATALE	-0.15	CAGLIARI	0.39	MILANO STATALE	-0.28
MEDIUM	BERGAMO	-1.09	CAGLIARI	-0.78	VERONA	-1.18	VENEZIA CA' FOSCARI	-1.07
MEDIUM	TRIESTE	-1.23	PARMA	-1.22	URBINO CARLO BO	-1.35	VERONA	-3.35
MEDIUM	VENEZIA CA' FOSCARI	-1.81	URBINO CARLO BO	-2.94	PAVIA	-2.07	MILANO BICOCCA	-3.52
MEDIUM	CALABRIA	-2.84	PISA	-4.05	PISA	-2.63	PAVIA	-3.57
MEDIUM	GENOVA	-3.62	VENEZIA CA' FOSCARI	-4.57	CATANIA	-2.72	ROMA TOR VERGATA	-5.18
MEDIUM	BRESCIA	-3.90	VERONA	-4.73	ROMA TOR VERGATA	-3.23	CAGLIARI	-5.66
MEDIUM	VERONA	-4.15	CALABRIA	-4.81	CALABRIA	-3.41	CASSINO	-6.63
MEDIUM	ROMA TOR VERGATA	-4.68	POLITECNICA MARCHE	-5.05	PALERMO	-4.65	CATANIA	-6.96
MEDIUM	CAGLIARI	-4.88	TRENTO	-5.11	MILANO BICOCCA	-4.69	CALABRIA	-7.49
MEDIUM	URBINO CARLO BO	-4.90	UDINE	-6.22	NAPOLI PARTHENOPE	-4.71	NAPOLI PARTHENOPE	-8.06
MEDIUM	NAPOLI PARTHENOPE	-5.09	GENOVA	-6.47	GENOVA	-5.75	TRENTO	-8.08
MEDIUM	UDINE	-5.43	LECCE	-6.57	BRESCIA	-7.06	PALERMO	-8.78
MEDIUM	TRENTO	-5.83	ROMA TOR VERGATA	-6.66	UDINE	-7.19	GENOVA	-8.95
MEDIUM	PISA	-6.67	BRESCIA	-7.51	POLITECNICA MARCHE	-8.13	BRESCIA	-9.66
MEDIUM	PERUGIA	-6.74	CASSINO	-10.09	LECCE	-8.48	UDINE	-9.71
MEDIUM	POLITECNICA MARCHE	-7.28	MILANO BICOCCA	-10.40	MILANO STATALE	-8.54	TRIESTE	-15.02
MEDIUM	LECCE	-7.34	NAPOLI PARTHENOPE	-10.69	TRIESTE	-8.66	LECCE	-15.50
MEDIUM	CASSINO	-7.90	PERUGIA	-10.70	VENEZIA CA' FOSCARI	-9.91	URBINO CARLO BO	-17.37
MEDIUM	PALERMO	-8.61	PIEMONTE ORIENTALE	-10.75	TRENTO	-12.71	POLITECNICA MARCHE	-19.04
MEDIUM	MESSINA	-9.02	PALERMO	-11.42	MESSINA	-13.95	MESSINA	-25.79
MEDIUM	PIEMONTE ORIENTALE	-9.90	MESSINA	-12.42	PIEMONTE ORIENTALE	-28.46	PIEMONTE ORIENTALE	-40.98
SMALL	PISA S. ANNA	89.55	PISA S. ANNA	49.43	SASSARI	11.21	SASSARI	15.01
SMALL	SASSARI	19.76	SASSARI	29.39	FERRARA	3.18	INSUBRIA	9.25
SMALL	BOLZANO	8.49	BOLZANO	13.70	TERAMO	0.50	NAPOLI SECONDA UN.	-0.55
SMALL	TERAMO	4.40	CAMERINO	0.98	NAPOLI SECONDA UN.	-0.98	VENEZIA IUAV	-0.75
SMALL	NAPOLI SECONDA UNIV.	-0.04	NAPOLI SECONDA UNIV.	0.35	VENEZIA IUAV	-1.29	TERAMO	-3.77
SMALL	VENEZIA IUAV	-0.26	VALLE D'AOSTA	0.30	INSUBRIA	-4.44	LUISS GUIDO CARLI	-5.46
SMALL	CUEIM	-0.54	TERAMO	-1.12	LUISS GUIDO CARLI	-5.53	SANNIO	-5.97
SMALL	LUMSA	-0.99	LIUC CARLO CATTANEO	-2.65	LIUC CARLO CATT	-5.75	FERRARA	-8.07
SMALL	FERRARA	-1.20	NAPOLI ORIENTALE	-5.10	L'AQUILA	-8.04	L'AQUILA	-10.19
SMALL	INSUBRIA	-1.39	INSUBRIA	-5.60	SANNIO	-8.51	LIUC CARLO CATT.	-10.60
SMALL	NAPOLI ORIENTALE	-1.81	LUISS GUIDO CARLI	-6.01	MOLISE	-9.20	MOLISE	-15.17
SMALL	POLITECNICO TORINO	-1.87	MOLISE	-6.31	CATANZARO	NA	FOGGIA	NA
SMALL	MACERATA	-2.16	FERRARA	-6.72	TUSCIA	NA	MACERATA	NA
SMALL	VALLE D'AOSTA	-2.34	L'AQUILA	-6.83	LUMSA	NA	CAMERINO	NA

SMALL	CATANZARO	-2.41	VENEZIA IUAV	-7.60	PISA S. ANNA	NA	NAPOLI ORIENTALE	NA
SMALL	LIUC CARLO CATTANEO	-3.57	FOGGIA	-9.22	NAPOLI ORIENTALE	NA	LUMSA	NA
SMALL	LUISS GUIDO CARLI	-3.88	SANNIO	-11.99	CUEIM	NA	TUSCIA	NA
SMALL	TUSCIA	-4.00	TUSCIA	-12.28	VALLE D'AOSTA	NA	CUEIM	NA
SMALL	CAMERINO	-4.46	LUMSA	NA	MACERATA	NA	POLITECNICO TORINO	NA
SMALL	L'AQUILA	-5.47	CATANZARO	NA	CAMERINO	NA	PISA S. ANNA	NA
SMALL	FOGGIA	-7.76	CUEIM	NA	BOLZANO	NA	CATANZARO	NA
SMALL	MOLISE	-11.00	MACERATA	NA	POLITECNICO TORINO	NA	VALLE D'AOSTA	NA
SMALL	SANNIO	-11.77	POLITECNICO TORINO	NA	FOGGIA	NA	BOLZANO	NA

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