Benchmarking Research in European Central Banks

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May 2003

1. Introduction

The merits of a decentralized organization of research in a system of central banks are well understood. For example, Goodfriend (1999) points out that the US Federal System has developed a pattern of specialization which tends to reflect federal reserve banks' comparative advantages. Likewise, Eijffinger (2002) highlights the diversification and incentive benefits derived from a spirit of rivalry among innovative central banks. Gaspar and Vega (2002) also remark that a decentralized system does not exclude voluntary collaboration between researchers, as evidenced by the successful implementation of recent Euro-wide research networks.

What is less clear, however, is the outcome that such a decentralized model can produce in Europe. In a recent article, Eijffinger, de Haan and Koedijk (2002a, EHK henceforth) claimed that the research performance of national central banks is inversely related to their size. Their results have attracted sharp criticism from Angelini (2002), who points out that flawed statistics render their conclusion that "small is beautiful" unwarranted. Gaspar and Vega (2002), on the other hand, give information about the European Central Bank's publication record in outside journals listed in EconLit. They explain that their institution compares well with the Federal Reserve Board, but fall short of showing how it is placed in comparison with European national central banks.

Measuring the quality of research among central banks participating in a decentralized system is a difficult and sensitive issue. There is a broad consensus among researchers that publication in professional refereed journals is the appropriate benchmark against which quality should be assessed. There is however no agreement about which journals should be in the benchmark and how they should be weighed. For example, the benchmark could rank all journals that the central bank community deems relevant, while excluding ad-hoc or national publications that some may think of lacking the necessary clout in academia. Finding an appropriate benchmark is of course a moot point which central banks have to come to grips with.

In this note, we establish diverse rankings of research output in European central banks based on all economic journals listed in EconLit over the period 1990-2002. We first construct a benchmark from three existing expert ratings and classify the EconLit reviews in five quality groups. We then do a wide trawl to identify central bank contributions according to the affiliation of their authors at the time of publication. We arrive at a quality-weighted number of publications or pages, which can in turn be converted into a measure of average quality or output per researcher for each central bank.

[1] Banque de France.

Our rankings are questionable given the imperfect sources of data and the specific methodology we use. More work is required to get a better idea about the relative performance of national central banks. However, we hope this attempt can be useful in starting a process which eventually serves the interests of European central banks' researchers as a whole, in particular within the Eurosystem. Rankings of that kind are routinely carried out among academic institutions and help incentivize students, faculty, universities and governments. The EEA recently invited bids for ranking economic departments in Europe (see http://www.eeassoc.org/). In the Eurosystem, the activities of research departments will likely be subjected to ever-closer scrutiny. Rankings of European central banks based on publications not only allow focusing on quality research, they indirectly shed light on the various tasks of economic departments and may help them muster the resources needed to bulk up their research activities.

In Section 2 we describe our data and methodology. We report our results in Section 3. Section 4 concludes the note.

2. Data and methodology

2.1. Setting the benchmark

There is no consensus in the profession on the overall ranking of economic journals beyond the most prestigious reviews. Many rankings are available, but there are problems with their use in Europe: they mostly focus on subsets of U.S. academic journals, weigh journals differently and place less emphasis on central banking or contemporary policy issues than might be desired. A first task is thus to determine how central bank publications should be weighed in terms of quality. Our benchmark strives to be consistent with the Eurosystem Heads of Research' recent effort to start building up a database based on EconLit journal publications.[2] There are currently about 700 journals in the list. This section starts by ranking all EconLit journals as a preliminary attempt to reflect the preferences of European central banks as a whole.

Although the rationale behind citation-based rankings is clear, the logic in a mere count can well leave many central banking considerations in the lurch. For this reason, some form of judgmental eclecticism may be preferable, as long as one is not suspected of tweaking the ranking to provide grist for one's own mill. We choose to stand in the lee of three benchmarks that seem relevant in our context. The first two are rankings adopted by the Federal Reserve Bank of New York and the Tinbergen Institute (TI). Since they are effectively used to evaluate research carried out by staff and job applicants, respectively, they are likely to reflect the true preferences of these institutions. The lists however deal only with high-quality reviews (76 for the New York Fed[3] and 133 for TI[4]), which as will be seen account for less than half of most central banks' publications. To be somewhat less selective, we combine these two rankings with that of Combes and Linnemer (2002, C&L henceforth) recently carried out at the behest of the EEA. One advantage of the last ranking is that it comprises all journals listed in EconLit.

The mapping between grades and rankings for these three benchmarks is as follows:

[2] A Task Force headed by the Banca d'Italia has just been set up with a view to extending the database to a broader period and submitting reports to the Council Task Force on the research work published by the Eurosystem staff. There are presently no plans to derive any ranking of institutions from it.

[3] We are grateful to João Santos for allowing us to use and communicate this list. The Fed's own publications have been removed from the list.

[4] The TI list gives a European flavor but is rather specific from the standpoint of a central bank, with specialized journals in fields such as operational research or transportation. The list can be found at the following address: http://www.tinbergen.nl/research/ranking.html.

Ranking	New York Fed		TI		C&L	
	Grade	Number	Grade	Number	Grade	Number
1	400	6	AA	5	12	6
2	200	13	A	29	8	14
3	100	57	B	99	6	38
4	other	—	other	—	4	75
5					other	—

C&L provide two additional buckets with grades 2 and 1, but we consolidate them as the accuracy with which they distinguish between different degrees of quality should not allow us to "slice and dice" the EconLit sample too differently from what the Fed and TI actually do. Thus, for example, a journal which is not in the Fed or TI list (or gets a grade lower than 4 with C&L) is ranked fourth (resp. fifth). Note that reviews marked "other" are not counted, as many titles indexed in EconLit are no longer referenced.

To aggregate the three benchmarks, we simply sum their rankings. Each review is then allocated to one of five quality groups according to the following scheme:

Aggregate ranking	Sum of rankings	Number	Weighting schemes		
			uniform	top-level	ratings-based
1	3-4	5	1	1	1.0
2	5-7	16	1	1	0.8
3	8-10	46	1	0	0.6
4	11-12	112	1	0	0.4
5	13	—	1	0	ε

One can wade through the list of journals ranked first to fourth in the Appendix. It is chiefly comprised of journals having a supra-regional distribution in English[5] and relying on a double blind referee procedure. The non-listed reviews have by construction a sum of rankings equal to $4+4+5=13$. They correspond to EconLit journals which are marked "other" in each of the three columns of the original table.

Having broad agreement with alternative benchmarks is a touchstone for consistency. We thus short-list a few well-known rankings for the sake of comparison: the SSCI *Citation Impact Factor*,[6] the *Adjusted Factor Impact* proposed by Kalaitzidakis, Mamuneas and Stengos (2001),[7] the VSNU *Quality Assessment*,[8] and the *Journal Rating* of the University of Vienna.[9]

[5] The list in the Appendix excludes some "excellent or very good publications in refereed journals" ("B" or "C" in VSNU standard, see paragraph below), such as *Annales d'Économie et de Statistique*, *Banca Nazionale del Lavoro Quarterly Review*, *De Economist*, *Economic Notes*, *Greek Economic Review*, *Recherches Économiques de Louvain*, which are viewed as national or regional journals by our three benchmarks and therefore placed in group 5. By contrast, we find *Weltwirtschaftliches Archiv* or *Scandinavian Journal of Economics*, which are considered meeting international standards.

[6] The *Citation Impact Factor*, based on the Social Science Citations Index (SSCI), is published at the end of each year in the *Journal of Citation Report*, by the Institute of Scientific Information. See the website www.isinet.com for additional details.

[7] Kalaitzidakis, Mamuneas and Stengos' *Adjusted Factor Impact* (2001) is based on citations of 1998 of articles published in the period 1994-1998. In comparison with the Citation Impact Factor, it controls for self-citations and the age of a journal. Unfortunately, it is restricted to economic (as opposed to financial) reviews. The paper is downloadable at the following address: www.uoguelph.ca/~tstengos/eearank93.pdf.

[8] The *Quality Assessment* of the VSNU (Dutch Society of Universities), established in 1994 and revised in 1996, has 1569 entries slotted into five buckets (from A to E). Note that it weakly discriminates between the first 210 journals, with ratings concentrated on As and Bs. The revised list can be found at the address www.econ.vu.nl/econometriclinks/journals/ lijstfeweur1996ranks.html. As put forward by Lubrano, Bauwens, Kirman, and Protopopescu (2003), this ranking has the reputation of being biased, as a result of the ranking committee's strategic behavior.

[9] The *Journal Rating* of the Wirtschaftsuniversität Wien (Wu-Wien) puts five marks (from A+ to D) against 1827 entries. Nor is the Wien Journal Rating very discriminating, with 715 references rated A or A+. The list can be found at the address http://www.wu-wien.ac.at/fides/frames.html.

The first two[10] are linked to the number of citations received in a given year by articles published over a given period in a journal quality list, while the last two are expert ratings relying on opinion surveys. A short description of these alternative rankings is provided in the Appendix.

We use three alternative weighting schemes in the sequel:

- First, a *uniform scheme* assigns equal weight to all papers. This is just a count of the production of central banks, irrespective of its quality.
- Second, a *top-level scheme* reckons journals that are lodestars to the profession. The weight is one for the 21 journals belonging to the first two groups, and zero otherwise. As will appear below, central banks seldom publish in these top-level journals.
- Finally, a *ratings-based scheme* uses a linear schedule to reflect our five gradations of quality. The linearity tends to level off the sharp differences common with other rankings. The exception is the bottom group, which is assigned a grade of ε. The reason is that it contains in most cases more than 50% of central banks' overall production of articles, so that its weighting is prone to affect their relative ranking. One objective of this paper is to ascertain the sensitivity of our results with respect to the choice of ε. We distinguish between papers written in English (ε_1) and in other languages (ε_2). The rationale behind the split is that central banks have implicit or explicit publication policies, with some viewing dissemination in their own language as an important responsibility, while others may favor the broader audience of English publications. We consider both $(\varepsilon_1, \varepsilon_2) = (.2,.2)$ and (.2,.1).

2.2. Methodology

There are two ways of ascribing publications to a research institution. The "stock" approach (e.g., C&L) counts the past production of its current members. In contrast, the "flow" approach counts production at the time of publication. Since we do not intend to derive a ranking of central banks according to their current human capital, the paper follows the second method to arrive at an estimate of central banks' average production over time. The measure aims to reflect European central banks' resourcefulness at hiring competent staff and providing them with a propitious working environment in the course of time.

A special concern is the extent of cooperation between in-house research staff and outside contributors. As we want to appraise the average performance of central banks' staff, rather than that of external contributors, we keep track of authors' affiliations. This is easy to check using the EconLit database, at least in principle.

Formally, let *K* be the total number of articles produced by all European central banks during the period *T*. The indexes $k = 1, \cdots, K$ and $i = 1, \cdots, I$ represent articles and central banks, respectively. For each article, we comb the "author affiliation" field reported in EconLit and search for characteristic expressions of the national central banks[11] in order to determine the total number of co-authors n^k and that of affiliated co-authors n_i^k. We can then apportion

[10] The data is excerpted from Harzing (2002). More information can be found on her website, www.harzing.com.

[11] Namely "Oesterreichische Nationalbank" or "Central Bank of Austria" or "Austrian Central Bank", "Banque Nationale de Belgique" or "Central Bank of Belgium", "Suomen Pankki" or "Bank of Finland", "Banque de France" or "Bank of France", "Deutsche Bundesbank", "Bank of Greece", "Central Bank of Ireland", "Banca d'Italia" or "Bank of Italy", "Banque Centrale du Luxembourg" or "Central Bank of Luxembourg", "De Nederlandsche Bank" or "Central Bank of the Netherlands", "Banco de Portugal" or "Bank of Portugal", "Banco de Espana" or "Bank of Spain", "Danmarks Nationalbank" or "Denmark National Bank", "Sveriges Riksbank", "Bank of England", "European Central Bank" or "ECB". Note that, since we did not find any paper published by the Central Bank of Luxembourg, we do not report results for this central bank.

authorship among central banks on a pro rata basis as n_i^k / n^k. Thus, if p^k is the number of pages of the *k*-th article and ω^k the weight of the journal in which it has been published (under any of the schemes defined above, i.e., uniform, top-level or ratings-based), the quality-weighted production of central bank *i* over period *T* is defined as:

$$W_i^{pn}(T) = \sum_{k=1}^{K} \frac{p^k \omega^k n_i^k}{n^k},$$

where the superscripts *p* and *n* stand for pages and co-authoring, respectively. We also define

$$W_i^{n}(T) = \sum_{k=1}^{K} \frac{\omega^k n_i^k}{n^k} \quad \text{and} \quad W_i(T) = \sum_{k=1}^{K} \omega^k 1_{\{n_i^k \neq 0\}},$$

where the former index disregards the number of pages and the latter only takes the rating of the journal into account, irrespective of the size of the article and the number of co-authors.

We do not split production between institutions when a given author has more than one affiliation. So if a central bank is listed among several affiliations, the researcher is reputed to be a staff member of that central bank.[12] Admittedly, we overlook a number of contributions, as EconLit may or may not report affiliations, depending on the way the journal displays them. In general, the main affiliation is reported, so that central banks' staff members are clearly identified. However, an academic consultant for example can readily be omitted if the affiliation is not reported in EconLit. Even if, in some cases, we are able to identify such omissions, we do not redress the balance, since this would introduce a bias in the treatment of central banks.

As research departments in European central banks are heterogeneous, an absolute ranking favors institutions with large staff. We thus report two alternative *relative* measures. The first, defined as $W_i(T)/K_i$ where $K_i = \sum_{k=1}^{K} 1_{\{n_i^k \neq 0\}}$ is the number of articles produced by central bank *i*, is the average quality of journals in which it is involved. By construction, the mean quality is bound by one as $0 \leq \omega^k \leq 1$. The second, defined as $W_i^{\bullet}(T)/N_i$ where $W_i^{\bullet}(T)$ stands for either $W_i^{pn}(T)$ or $W_i^{n}(T)$, is the quality-weighted production per researcher. We have scant evidence of the size in man-years N_i of economics and research staff across central banks and take as a proxy the sum $\sum_{k=1}^{K} n_i^k$ of affiliated authors found in EconLit over the period.

The approximation can be justified as follows. Consider for example the production in terms of pages. Let $\lambda_i^k = (p^k \omega^k / n^k) 1_{\{n_i^k \neq 0\}}$ be the unit contribution of the n_i^k authors at central bank *i* involved in article *k*. Then $W_i^{np}(T) = \sum_{k=1}^{K} \lambda_i^k n_i^k$. The contribution of the team λ_i^k depends on the average skill of its members, the synergy between them, the time spent on the project, mere luck and so on. If we make the heroic assumption that λ_i^k is independent of the size n_i^k of the team, we can approximate the sum above with $\overline{\lambda}_i \sum_k n_i^k$, where $\overline{\lambda}_i$ is the mean contribution of the researchers affiliated with central bank *i*.

[12] We have some evidence that authors whose affiliation has changed before the end of the editorial process may prefer — or be encouraged — to list the institution with which they are affiliated at the time of the publication.

The output per researcher index is based on the staff that have been involved in research at least once during the period. This may include consultants or students preparing their Ph.D. thesis, as well as people from other departments. Relying on the size of economics and research departments would lead to overlook the contribution of staff from other departments or, conversely, to misrepresent the various responsibilities covered by economics and research departments. On the other hand, our proxy may generate large biases to the extent that, for example, the best research is produced by a few stand-alone individuals. It is reasonable, however, to expect that such biases could be reduced when looked upon over a longer period.

3. Results

Our tables present first the results of the national central banks in the Eurosystem, then that of the other central banks in the EU. Results for the ECB are only indicative, since data are collected from 1999 to 2002 only.

3.1. Statistics on central banks' publications

We start by providing some details on the number of EconLit articles published by central banks in Europe during the period 1990-2002, without any reference to the quality of the journals in which they appear.

Table 1 reports the distribution of papers year by year. Results for 2002 are provisional, because some journals do not provide their database in real time. There is a wide discrepancy between central banks. The most prominent institutions are the Bank of Italy and the Bank of England, with an average of 24 and 16 articles per year respectively. In the second group are Finland, France, Greece and Spain, with an average of 6 to 10 articles per year. Interestingly, some central banks have increased the number of papers published in the recent period. This is the case for Austria, France, Germany, Greece, Sweden and the UK. Conversely, the production of Portugal has slackened off from a peak in 1997.

Table 2 highlights the issue of co-authoring. We distinguish whether a given article has been written by central bank staff only, or with co-authors from non-central-bank institutions. Some central banks, like in Greece, Spain, Sweden or the UK, lay more emphasis on external collaboration. In contrast, more than three-quarters of the central bank production of Finland, Germany, Italy and Denmark is written by staff only. In Finland and Germany, more than 60% of papers are even written by a single author.

3.2. Quality distribution of publications

We report in Table 3 the distribution of papers according to their rank. This is a measure that job applicants, looking for large research departments, would be interested in.

Only a few central banks have a significant proportion of papers published in top-level journals (ranked first to second in our benchmark). In percentage, the Bank of Portugal dwarfs all other European central banks (30%), although Sweden (16%), the UK (13%) and Spain (12%) are clearly front-runners. Interestingly, the Bank of Italy and the Bank of France have a significant number of papers in top-level journals, but they appear less outstanding when the result is taken in percentage.

At the opposite end of the spectrum, the proportion of articles in bottom-rank journals is often quite substantial. It exceeds 80 percent in Austria, Ireland and Denmark. In non-English speaking countries, these publications are sometimes predominantly written in the national

tongue: the concentration is as high as 65% in Denmark, 51% in France and 50% in Spain. By contrast, the central banks of Greece and the Netherlands essentially publish in English. The Bank of Portugal and the Bank of England have very few papers published in the last category.

Taking this all in, we see that European central banks seem to have different policies with respect to publications. The Bank of Portugal, the Bank of England and, to a lesser extent, the Bank of Sweden put a great emphasis on high-quality publications, while the central banks of Finland, France, Greece, Italy, the Netherlands and Spain score both in national and international, often fair to middling, publications. Our results so far do not warrant the view that "small is beautiful."[13]

3.3. Rankings under various weighting schemes

Table 4 reports synthetic quality-adjusted production indices under alternative weighting schemes. As for the rating of journals in the bottom group, the table assumes both $\varepsilon = (.2,.2)$ and $\varepsilon = (.2,.1),$ so that articles in English can be worth twice those written in other languages.

The main results can be glanced from the top three rows, which correspond to the index $W_i(T)$ marked "with no correction." Numbers in small print indicate central banks' positions in the ranking. As we have seen, a mere count (uniform scheme) yields Italy and the UK as the winners, in that order. However, when corrected for quality with $\varepsilon = (.2,.1),$ the ordering is reversed, as the Bank of Italy publishes a significant part of its papers in Italian journals with score one tenth. A similar move obtains between France and Spain, which are ranked third and fourth under the uniform and ratings-based schemes, or between Germany and Portugal. Such quality-induced changes can be substantial when looked at through the lens of the top-21 reviews: the Bank of Portugal, for example, gets upgraded from the ninth to the fourth position.

The statistics above does not take into account the joint production of articles, which results in an over-estimate of the contribution of the staff. The average ratio of staff members over the total number of authors (roughly defined as $\sum_{k=1}^{K} n_i^k / \sum_{k=1}^{K} n^k 1_{\{n_i^k \neq 0\}}$) is quite variable across central banks: it is rather low for Austria, Spain, Greece and the UK, and large for Germany, Italy and Denmark.[14] In fact, using the statistics with the correction for the number of co-authors noted $W_i^n(T)$, we find only a few changes. The Bank of Italy wangles its ways into the Bank of England's first position under the ratings-based scheme, as it relies relatively less on co-authoring. Those two central banks stay well ahead of others. In the second group come France and Spain. Greece, Finland and Portugal can be bundled in a third group.

Conditional on top-level journals only, the ranking has the central banks of the UK, Italy, Portugal, Spain and France, in that order. Apart from the Bank of England remaining now unchallenged, the Bank of France gives in its third position to the Bank of Portugal. Note that, in a recent paper, Lubrano, Bauwens, Kirman, and Protopopescu (2003) obtained almost the same ranking among those five central banks viewed as European Economic departments.

[13] The last two rows of Table 3 compare the count of publications ranked first to fourth in our benchmark with that selected by Eijffinger, de Haan, and Koedjik (2002). Apart from the mistaken number of publications at the Bank of Italy (7 vs. 99) already singled out by Angelini (2002) and at the Bank of England (10 vs. 125), we observe that EHK strongly favor the central banks of Austria (14 vs. 5) and the Netherlands (49 vs. 21). The difference shows how sensitive results are to different benchmarks. We checked that adding in our list the journals *De Economist*, *Empirica*, and *Banca Nazionale del Lavoro Quarterly Review* had a significant impact on the output of the central banks of Austria and the Netherlands and helped reconcile the two rankings. Central banks could be forced into a vigorous debate on which national publications to retain if they had to agree on a common list.

[14] See also Table 2.

The only difference is the switch in the relative positions of France and Spain, which can be explained by the fact that their review list is significantly less restrictive than permitted by our top-level scheme.

Finally, factoring in the number of pages as shown by $W_i^{pn}(T)$ leaves the rankings virtually unchanged. The choice of ε, that allows to distinguish between papers written in English and other languages, also appears to have only a marginal effect.

3.4. Relative rankings

In Table 5, we report the average quality of papers published by central bank staff. The score assigned to each paper is not weighted by the number of co-authors, as we want to measure the intrinsic quality of papers. (Here, scores are multiplied by a factor of 10 to enhance readability.) With $\varepsilon = (.2,.1)$, the score is 5.1 for the Bank of Portugal, 4.3 for the Bank of Sweden and the Bank of England. Then come the Bank of Greece and De Nederlandsche Bank. This ranking may be indicative of a publication strategy geared to encourage publications in outstanding international journals.

We report in Table 6 the number of researchers affiliated with central banks through the period 1990-2002 (defined as $\sum_{k=1}^{K} n_i^k$). It is very large at the Bank of Italy (158) and at the Bank of England (114), much lower at the Bank of Spain (69) and the Bank of France (60). The quality-adjusted output per researcher is the largest at the Bank of Portugal (11.8), followed by the Bank of Greece (9.8), the Bank of Sweden (8.9) and the Bank of England (7.8). Under the top-level scheme, Portugal (6.5) towers above Sweden (3.3), the UK (2.3) and Spain (2).

4. Conclusion

Our purpose here is not to claim that any particular central bank provides the best standards of excellence in research. We obtained several rankings with the same benchmark. More importantly, the information we have on central banks' research output and staff is severely limited. Our results are biased in several dimensions and represent at best a preliminary attempt at benchmarking central banks in Europe.

Some features render the comparison between central banks difficult. There are many dimensions along which this comparison can be drawn, both regarding the input (staff) and the output (research). Looking just at the output helps overcome part of the error-in-variables problem, but it is likely that some disagreement about quality will remain beyond the most prestigious journals. Naturally, there are also large discrepancies between central banks as a result of tradition or culture, so that the structures which are supposed to carry out "research" also cover a variety of other activities.

However imperfect any measures of research output are bound to be, we hope this attempt can prompt a favorable response from other central banks willing to pool resources and effort to improve upon it. Many items are on the agenda, such as a list of refereed professional journals suitable for central banks, a methodology to rank them without prejudice to good national publications, and a common approach to increasing awareness of the relevance of quality research for policy.

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Appendix: Benchmark list

1. Description of indicators

VSNU Quality Assessment (1994, 1996): List made by VSNU (*Vereniging Samenwerkende Nederlandse Universiteiten*, Dutch Society of Universities) in the Netherlands and based on a survey of Dutch academics in economics and business. It has a bias towards Economics, Finance and Accounting, and Quantitative Methods, but covers a larger range of subjects.

This list has been updated in 1996. The updated list contains 1476 journals. It can be found at the website address www.econ.vu.nl/econometriclinks/journals/lijstfeweur1996ranks.html.

	Number of journals	
	1994	1996
A – Top publications in heavily refereed journals	54	119
B – Excellent publications in - mostly- English and heavily refereed journals	158	235
C – Very good publications in refereed journals	276	358
D – Good publications in moderately refereed journals	478	473
E – Publications in other journals	294	291

Wu Wien Journal Rating (2001): List made by the Wirtschaftsuniversität Wien (http://www.wu-wien.ac.at/fides/WU-Jranking_en.html). It contains 1827 entries.

A+ – Top journals with world-wide distribution and readership; covering the entire scope of a discipline; contributions are scientifically and methodologically most fastidious and innovative; very frequently pioneer work and milestones of the respective discipline; incomprehensible for non-scientists or readers without in-depth method knowledge; toughest competition of authors from all over the world; refereed in a double blind procedure (at least two referees); highest impact scores.

A – World-wide distributed journals; emphasis in just one linguistic area as the exception; covering an entire discipline or an established sub-discipline; contributions are scientifically and methodologically most fastidious and innovative; frequently pioneer work and milestones of the respective discipline; understandable for graduates of relevant studies; strong competition of authors from an international realm; refereed in a double blind procedure (at least two referees); high impact scores.

B – Journals with at least supra-regional distribution in any language; covering at least an established sub-discipline; contributions are scientifically or methodologically innovative; understandable for practitioners without any degree in relevant studies; manuscript submissions from a supra-regional realm; refereed in a double blind procedure (at least two referees); impact score not relevant.

C – At least national distribution; covering at least established sub-discipline; the editors pay attention to legibility for non-scientist, although research results have editorial priority; practitioners rank among the core target group; at least national contributions; not necessarily anonymously refereed; however one external referee at least; impact factor not relevant.

D – At least national distribution; specialized on any level; contributions contain results in simplified form; practitioners appear frequently as authors; contributions are aimed at

teaching or vocational training of practitioners; at least national contributions; no formal reviewing procedures; however one external referee at least; impact factor not relevant.

	Number of journals
A+ – Top journals	40
A –World-wide distributed journals	675
B – Journals with at least supra-regional distribution	728
C – Very good journals with at least national distribution	246
D – Good journals with at least national distribution	138

Social Science Citations Index Citation Impact Factor (average over 1998-2001): The citation impact factor is a measure of the frequency with which the average article in a journal has been cited in a particular year. The CIF is published at the end of each year in the Journal of Citation Reports, edited by the Institute for Scientific Information (see the website www.isinet.com). The CIF is defined as a ratio between citations and quotable items published. It is a reasonable and relatively objective assessment of journal impact. Despite the imperfections of the measure, there seems to be a significant correlation between citation impact and perceived quality.

Adjusted factor impact (KMS) (2001): This factor impact is based on the paper by Kalaitzidakis, Mamuneas, and Stengos (2001). The approach is similar to CIF but accounts for some biases. Economic (not financial) journals are ranked based on the number of citations received in 1998 of articles published in 1994-98 period. The top journal (*AER*) is normalized to be equal to 100. Factor impacts are corrected for the number of pages.

2. Remarks

Although we refrain as much as possible from editing our source benchmarks, we had a few niggling doubts about the C&L ranking. We disagree with the rating of the *Review of Financial Studies* and upgrade it from 4 to 6. Likewise, we pick three reviews standing in the gray zone of C&L and give them grade 4: the *Journal of Accounting and Economics*, the *Journal of Accounting and Research* and *Management Science*. As can be glanced from the table, these reviews have citation- or survey-based indices that seem inconsistent with C&L's reported rankings. One potential reconciliation is that C&L tend to discount reviews which they regard as marginal with respect to the main economics and financial fields.

	VSNU Quality Assess-ment (94 -> 96)	Wien Univ. Journal Rating (2001)	SSCI Citation Impact Factor (98-01)	KMS Adjusted Factor Impact (2001)	**Baseline rankings**			**Our journal ranking**
					Combes-Linnemer (2002)	Fed	Tinbergen Institute	
American Economic Review	A	A+	1.91	100.0	12	400	AA	**1.0**
Econometrica	A	A+	2.02	96.8	12	400	AA	**1.0**
Journal of Political Economy	A	A+	2.36	65.2	12	400	AA	**1.0**
Quarterly Journal of Economics	A	A+	3.92	58.1	12	400	AA	**1.0**
Review of Economic Studies	A	A	1.51	45.2	12	400	AA	**1.0**
European Economic Review	B	A+	0.90	23.8	8	200	A	**0.8**
Games and Economic Behavior	D->B	A	0.55	35.5	8	100	A	**0.8**
International Economic Review	A	A	0.85	23.0	8	200	A	**0.8**
Journal of Business & Economic Statistics	A	A	0.81	38.4	8	100	A	**0.8**
Journal of Econometrics	B	A+	1.07	54.9	8	200	A	**0.8**
Journal of Economic Theory	A	A	0.74	58.8	12	200	A	**0.8**
Journal of Finance	A	A+	2.63	-	8	400	A	**0.8**
Journal of Financial Economics	A	A	1.99	-	6	200	A	**0.8**
Journal of International Economics	A	A	1.44	7.8	6	200	A	**0.8**
Journal of Labor Economics	B	A	1.15	12.8	8	200	A	**0.8**
Journal of Monetary Economics	A	A	1.07	36.4	8	200	A	**0.8**
Journal of Money, Credit, & Banking	A	A	0.98	-	8	200	B	**0.8**
Journal of Public Economics	B->A	A	0.85	19.8	8	200	A	**0.8**
RAND Journal of Economics	A	A	1.13	11.4	8	200	A	**0.8**
Review of Economics & Statistics	A	A	1.10	28.0	8	200	A	**0.8**
Review of Financial Studies	C->A	A	1.37	-	*4->6*	200	A	**0.8**
Accounting Review	A	A	0.91	-	4		A	**0.6**
American Journal of Agricultural Economics	B	A	0.57	6.2	6	100	B	**0.6**
Canadian Journal of Economics	B	A	0.35	5.1	6	100	B	**0.6**
Econometric Theory	B	A	0.47	45.9	6	100	A	**0.6**
Economic Inquiry	B	A	0.57	6.0	4	100	B	**0.6**
Economic Journal	A	A	1.35	20.7	6	100	A	**0.6**
Economic Theory	C->B	A	0.41	22.4	6		B	**0.6**
Economica	B	A	0.60	4.6	6	100	B	**0.6**
Economics Letters	B	A	0.25	18.7	6	100	B	**0.6**
Explorations in Economic History	C	B	0.42	3.0	4	100	B	**0.6**
Industrial and Labor Relations Review	C	A	1.24	-	6	100	B	**0.6**
International Journal of Game Theory	C	A	0.43	6.1	6		B	**0.6**
International Journal of Industrial Organization	B->C	A	0.47	4.3	4	100	B	**0.6**
Journal of Accounting and Economics	A	A	0.79	0.8	*2->4*	100	A	**0.6**
Journal of Accounting Research	A	A	1.02	-	*2->4*	100	B	**0.6**
Journal of Applied Econometrics	B	A	0.80	16.6	6	100	B	**0.6**
Journal of Banking & Finance	B	A	0.61	-	6	100	B	**0.6**
Journal of Business	B	A	1.15	-	6	100	B	**0.6**
Journal of Comparative Economics	B	B	0.78	3.4	6	100	B	**0.6**
Journal of Development Economics	B	A	0.61	5.5	6	100	B	**0.6**
Journal of Economic Behavior & Organization	B->C	A	0.49	7.1	6	100	B	**0.6**
Journal of Economic Dynamics & Control	B	A	0.62	14.5	6	100	B	**0.6**
Journal of Economic History	A	A	0.69	3.8	6	100	B	**0.6**
Journal of Economic Literature	A	A+	6.74	18.8	6	100	A	**0.6**
Journal of Economic Perspectives	C	A	2.81	34.3	6	100	A	**0.6**
Journal of Economics and Management Strategy	*C*	B	0.47	0.4	6		B	**0.6**
Journal of Environmental Economic & Management	B	A	1.26	11.9	6		A	**0.6**
Journal of Financial & Quantitative Analysis	B->A	A	0.69	-	6	100	B	**0.6**
Journal of Health Economics	B	A	2.06	1.6	6	100	A	**0.6**
Journal of Human Resources	B	A	1.19	21.3	6	100	A	**0.6**

Journal of Industrial Economics	B	A	0.95	3.9	6	100	B	**0.6**
Journal of International Money & Finance	A->B	A	0.62	-	4	100	B	**0.6**
Journal of Law and Economics	B	A	1.23	3.9	6	100	B	**0.6**
Journal of Law, Economics, and Organization	*A*	A	1.21	4.1	6		B	**0.6**
Journal of Mathematical Economics	A	A	0.32	7.6	6	100	B	**0.6**
Journal of Risk & Uncertainty	*B*	A	1.06	5.6	6		B	**0.6**
Journal of the American Statistical Association	D->A	A+	1.63	-	8	100		**0.6**
Journal of Urban Economics	*B*	A	0.84	4.4	6	100	B	**0.6**
Land Economics	C	A	1.08	5.1	6		B	**0.6**
Management Science Series A - Theory	A	A+	1.17	-	*1->4*		A	**0.6**
Oxford Bulletin of Economics & Statistics	C	B	0.58	8.4	4	100	B	**0.6**
Public Choice	B	A	0.33	5.0	6	100	B	**0.6**
Regional Science and Urban Economics	A	A+	0.56	1.6	6		B	**0.6**
Scandinavian Journal of Economics	B	A	0.45	10.7	6		B	**0.6**
Social Choice & Welfare	B	A	0.56	6.9	6		B	**0.6**
World Bank Economic Review	B	A	1.08	5.7	4		A	**0.6**
American Political Science Review	A		2.19	-	4			**0.4**
Antitrust Bulletin			-	-	4			**0.4**
Applied Economics	C->B	A	0.21	2.0	4		B	**0.4**
British Journal of Industrial Relations	C	A	0.94	-	4			**0.4**
Brookings Papers on Economic Activity	-	A+	2.50	0.7	4	100		**0.4**
Cambridge Journal of Economics	B	A	0.95	1.3	4		B	**0.4**
Carnegie-Rochester Series on Public Policy		-	-	-	4	100		**0.4**
Contemporary Economic Policy		A	0.44	2.4			B	**0.4**
Demography			-	-	4	100		**0.4**
Ecological Economics	C	A	1.22	-			B	**0.4**
Economic Development and Cultural Change	B	A	0.75	-			B	**0.4**
Economic Geography	B	A	1.68	0.1	4		B	**0.4**
Economic History Review	B	A	1.02	1.3	4		B	**0.4**
Economic Modelling	B->C	B	0.24	0.5	4			**0.4**
Economic Policy - A European Forum	C	A	2.10	-	4		B	**0.4**
Economic Record	-	-	0.30	2.9	4		B	**0.4**
Economics and Philosophy	D->B	B	0.59	-	4		B	**0.4**
Economics and Politics		B	-	-	4			**0.4**
Economics of Transition		B	0.56	-	4			**0.4**
Energy Economics	B	A	0.43	0.0	4		B	**0.4**
Environment and Planning A	B	A+	1.14	-	4		B	**0.4**
Environmental and Resource Economics	C	A	0.32	-			B	**0.4**
European Journal of Political Economy	B	A	-	-	4			**0.4**
European Review of Agricultural Economics	B	B	0.51	-	4			**0.4**
Experimental Economics			-	-	4			**0.4**
Financial Management	B->C	A	0.84	-		100	B	**0.4**
Financial Markets, Institutions, and Instruments			-	-		100		**0.4**
Geneva Papers of Risk and Insurance	B->C	A	0.30	0.9	4			**0.4**
Health Economics			2.07	0.2			B	**0.4**
History of Political Economy	A->B	A	0.16	0.2	4			**0.4**
Industrial Relations	C	B	1.02	-	4			**0.4**
Insurance: Mathematics and Economics	A->B	B	0.34	-			B	**0.4**
International Journal of Forecasting	C	B	0.50	-		100	B	**0.4**
International Journal of Urban and Reg. Research	C	A	1.30	-	4			**0.4**
International Monetary Fund Staff Papers	C	B	0.85	5.1		100	B	**0.4**
International Review of Law and Economics	B	-	0.67	0.1			B	**0.4**
International Tax and Public Finance			0.42	-			B	**0.4**
Journal of Agricultural Economics	C	B	0.56	-	4			**0.4**
Journal of Applied Economics	B	-	-	-			B	**0.4**
Journal of Common Market Studies	C	B	1.29	-	4			**0.4**

Journal of Development Studies	C	A	0.71	-	4			**0.4**
Journal of Economic Growth		-	1.53	-	4	100		**0.4**
Journal of Economic Issues	B	A	0.42	0.4			B	**0.4**
Journal of Economic Psychology	B	A	0.38	0.3			B	**0.4**
Journal of Economic Studies	C	C	-	-	4			**0.4**
Journal of Empirical Finance	*B*	A	-	-	4			**0.4**
Journal of Evolutionary Economics	D	A	0.48	0.3			B	**0.4**
Journal of Financial Intermediation	*B*	A	0.84	-		100	B	**0.4**
Journal of Financial Research	B->C	A	-	-		100		**0.4**
Journal of Financial Services Research	C		0.17	-		100		**0.4**
Journal of Forecasting	C	A	0.43	-			B	**0.4**
Journal of Futures Markets	D->C	C	0.35	-		100		**0.4**
Journal of Institutional and Theoretical Economics	B	A	0.57	2.0	4		B	**0.4**
Journal of International Business Studies	C->B	A	0.97	-	4			**0.4**
Journal of Macroeconomics	B	B	0.18	1.8			B	**0.4**
Journal of Population Economics	B	A	0.47	2.4	4		B	**0.4**
Journal of Portfolio Management	C	A	0.27	-		100		**0.4**
Journal of Post Keynesian Economics	B	A	0.43	0.3	4		B	**0.4**
Journal of Regional Science	A	A+	0.55	-	4			**0.4**
Journal of Regulatory Economics	C	A	0.45	0.6	4	100		**0.4**
Journal of Risk & Insurance	C	A	0.36	0.4	4	100		**0.4**
Journal of the Japanese and Intl Economies			0.34	0.8	4			**0.4**
Journal of the Royal Statistical Society, Series A	A	A	1.38	-	4			**0.4**
Journal of Transport Economics and Policy	B	A	0.49	-			B	**0.4**
Kyklos	B	A	0.40	0.9	4		B	**0.4**
Labour Economics			-	-	4			**0.4**
Macroeconomic Dynamics	-	A	0.71	-		100	B	**0.4**
Marketing Science	A	A+	1.53	-	4		B	**0.4**
Mathematical Finance	*C*	A	1.03	-			B	**0.4**
Mathematical Methods of Operations Research	C	A	-	-	4			**0.4**
Mathematical Social Sciences	C	A	-	-	4			**0.4**
National Tax Journal	B	A	0.64	3.9	4		B	**0.4**
Open Economies Review	D	A	0.18	0.3	4			**0.4**
Oxford Economic Papers	B	A	0.69	3.7	4		B	**0.4**
Oxford Review of Economic Policy	-	B	0.61	1.6			B	**0.4**
Regional Studies	B	A+	1.11	-	4			**0.4**
Research Policy	C	A	1.08	-	4			**0.4**
Resource and Energy Economics		A	0.47	0.8			B	**0.4**
Review of Economic Dynamics		B	-	-		100		**0.4**
Review of Income & Wealth	B	B	0.36	1.7		100	B	**0.4**
Review of International Economics		A	-	-	4	100		**0.4**
Review of Radical Political Economics	B	A	-	-	4			**0.4**
Scottish Journal of Political Economy	B	A	0.42	1.8			B	**0.4**
Sloan Management Review	B->A	A	1.60	-	4			**0.4**
Small Business Economics	D->C	A	0.43	1.3			B	**0.4**
Southern Economic Journal	B	B	0.34	3.1	4		B	**0.4**
Theory & Decision	B	B	0.31	4.9	4		B	**0.4**
Transportation Research B - Methodological	B	A+	-	-			B	**0.4**
Urban Studies	B	A	0.87	-	4			**0.4**
Weltwirtschaftliches Archiv	B	A	0.37	0.9	4		B	**0.4**
World Development	B	A	0.92	3.2	4		B	**0.4**
World Economy	C	A	0.68	1.3	4		B	**0.4**

Table 1: Distribution of papers by year of publication

	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherl.	Portugal	Spain	Denmark	Sweden	UK	ECB (99-02)
1990	1	0	11	4	2	2	2	15	4	0	7	2	0	17	-
1991	0	0	8	6	0	4	2	22	0	0	3	1	0	21	-
1992	1	1	7	9	5	1	1	13	2	6	7	2	0	12	-
1993	0	1	3	7	2	2	2	15	5	4	7	2	1	9	-
1994	0	1	9	6	3	6	3	23	3	5	14	1	2	9	-
1995	5	2	3	6	2	4	5	22	5	8	6	1	0	7	-
1996	2	1	3	10	4	4	0	29	1	10	5	0	1	10	-
1997	0	1	0	7	4	8	1	23	5	2	10	1	4	15	-
1998	0	2	6	7	7	15	1	28	15	2	9	2	3	23	3
1999	4	2	7	17	2	8	3	39	4	3	9	2	8	20	20
2000	9	1	9	13	3	11	4	29	5	2	13	0	5	24	19
2001	6	0	10	15	9	13	4	43	3	1	8	1	11	13	27
2002 (prov.)	6	1	9	14	7	7	5	14	5	3	19	2	2	26	23
Total	**34**	**13**	**85**	**121**	**50**	**85**	**33**	**315**	**57**	**46**	**117**	**17**	**37**	**206**	**92**

Table 2: Distribution of papers by number of co-authors (in %)

	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherl.	Portugal	Spain	Denmark	Sweden	UK	ECB (99-02)
With inside co-author	**47.1**	**69.2**	**74.1**	**64.5**	**78.0**	**51.8**	**63.6**	**74.6**	**70.2**	**60.9**	**54.7**	**82.4**	**51.4**	**47.1**	**65.2**
1	41.2	46.2	62.4	39.7	68.0	30.6	48.5	52.1	45.6	45.7	33.3	58.8	37.8	33.5	47.8
2	5.9	23.1	11.8	22.3	8.0	18.8	12.1	17.1	22.8	8.7	14.5	23.5	10.8	10.2	7.6
3	0.0	0.0	0.0	1.7	0.0	1.2	3.0	4.8	1.8	6.5	5.1	0.0	0.0	3.4	5.4
more	0.0	0.0	0.0	0.8	2.0	1.2	0.0	0.6	0.0	0.0	1.7	0.0	2.7	0.0	4.3
With outside co-author	**52.9**	**30.8**	**25.9**	**35.5**	**22.0**	**48.2**	**36.4**	**25.4**	**29.8**	**39.1**	**45.3**	**17.6**	**48.6**	**52.9**	**34.8**
1/2	35.3	23.1	20.0	23.1	20.0	24.7	24.2	16.8	24.6	32.6	24.8	17.6	37.8	34.5	23.9
1/3	17.6	7.7	5.9	7.4	2.0	17.6	12.1	3.5	5.3	4.3	15.4	0.0	8.1	12.6	9.8
2/3	0.0	0.0	0.0	5.0	0.0	5.9	0.0	5.1	0.0	2.2	5.1	0.0	2.7	5.8	1.1
Total	**34**	**13**	**85**	**121**	**50**	**85**	**33**	**315**	**57**	**46**	**117**	**17**	**37**	**206**	**92**

Table 3: Distribution of papers by rank (in %)

	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherl.	Portugal	Spain	Denmark	Sweden	UK	ECB (99-02)
Top-level (0.8 to 1.0)	2.9	7.7	5.9	6.6	2.0	2.4	3.0	6.3	7.0	28.3	12.0	0.0	16.2	12.6	9.8
1	0.0	0.0	0.0	0.8	0.0	1.2	0.0	0.6	0.0	4.3	1.7	0.0	5.4	1.0	2.2
0.8	2.9	7.7	5.9	5.8	2.0	1.2	3.0	5.7	7.0	23.9	10.3	0.0	10.8	11.7	7.6
0.6	2.9	7.7	4.7	14.9	10.0	12.9	0.0	9.5	8.8	26.1	10.3	0.0	24.3	27.7	6.5
0.4	8.8	7.7	16.5	6.6	14.0	16.5	15.2	15.6	21.1	19.6	11.1	11.8	13.5	20.4	21.7
ε	85.3	76.9	72.9	71.9	74.0	68.2	81.8	68.6	63.2	26.1	66.7	88.2	45.9	39.3	62.0
of which: English	*76.5*	*61.5*	*51.8*	*20.7*	*50.0*	*67.1*	*81.8*	*35.2*	*63.2*	*17.4*	*17.1*	*23.5*	*45.9*	*39.3*	*57.6*
Other language	*8.8*	*15.4*	*21.2*	*51.2*	*24.0*	*1.2*	*0.0*	*33.3*	*0.0*	*8.7*	*49.6*	*64.7*	*0.0*	*0.0*	*4.3*
Total	**34**	**13**	**85**	**121**	**50**	**85**	**33**	**315**	**57**	**46**	**117**	**17**	**37**	**206**	**92**
Comparison with EHK															
0.4 to 1.0	5	3	23	34	13	27	6	99	21	34	39	2	20	125	35
EHK (2002a)	14	7	20	-	-	-	3	7	49	31	29	5	6	10	29
EHK (2002b)	14	7	20	-	-	41	3	89	49	31	29	3	5	8	29

Table 4: Ranking of central banks

	Austria		Belgium		Finland		France		Germany		Greece		Ireland		Italy		Netherl.		Portugal		Spain		Denmark		Sweden		UK		ECB (99-02)	
With no correction																														
Equal weighting	34	11	13	14	85	5	121	3	50	8	85	6	33	12	315	1	57	7	46	9	117	4	17	13	37	10	206	2	92	-
Ratings-based (0.2/0.2)	8.4	11	3.8	14	24.4	6	38.0	4	13.6	10	25.6	5	8.2	12	97.2	1	18.2	8	24.0	7	39.6	3	3.8	13	16.0	9	88.4	2	30.6	-
Ratings-based (0.2/0.1)	8.1	12	3.6	13	22.6	7	31.8	4	12.6	10	25.5	5	8.2	11	86.7	2	18.2	8	23.6	6	33.8	3	2.7	14	16.0	9	88.4	1	30.2	-
Top-level	1	10	1	10	5	7	8	5	1	10	2	9	1	10	20	2	4	8	13	4	14	3	0	14	6	6	26	1	9	-
With correction for number of co-authors																														
Equal weighting	24.0	12	10.8	14	73.2	5	99.0	3	42.3	8	62.8	6	26.3	11	275.8	1	48.0	7	36.8	9	88.5	4	15.5	13	27.7	10	149.2	2	74.2	-
Ratings-based (0.2/0.2)	5.4	12	2.9	14	19.7	5	30.5	3	11.6	9	18.6	7	6.6	11	82.1	1	14.5	8	18.7	6	27.2	4	3.5	13	11.5	10	62.3	2	23.0	-
Ratings-based (0.2/0.1)	5.2	12	2.7	13	18.1	7	25.3	3	10.7	10	18.5	5	6.6	11	72.4	1	14.5	8	18.3	6	22.0	4	2.5	14	11.5	9	62.3	2	22.6	-
Top-level	0.3	13	0.5	12	2.7	8	5.3	5	1.0	10	1.5	9	1.0	11	15.5	2	3.0	7	9.8	3	8.2	4	0.0	14	3.5	6	18.5	1	5.3	-
With correction for number of co-authors and pages																														
Equal weighting	383	12	291	13	1159	5	2025	3	589	9	1070	6	565	10	6261	1	965	7	657	8	1736	4	252	14	526	11	2448	2	1546	-
Ratings-based (0.2/0.2)	89	12	72	13	319	6	603	3	169	10	312	7	137	11	1782	1	276	8	322	5	514	4	65	14	222	9	1036	2	490	-
Ratings-based (0.2/0.1)	87	12	64	13	301	7	486	3	153	10	311	5	137	11	1541	1	276	8	311	6	413	4	54	14	222	9	1036	2	485	-
Top-level	5	13	6	12	42	8	79	5	13	11	28	9	17	10	313	2	54	7	173	3	128	4	0	14	73	6	315	1	108	-

Table 5: Quality of publications

	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherl.	Portugal	Spain	Denmark	Sweden	UK	ECB (99-02)
Number of papers	**34**	**13**	**85**	**121**	**50**	**85**	**33**	**315**	**57**	**46**	**117**	**17**	**37**	**206**	**92**
Ratings-based (0.2/0.2)	2.47	2.92	2.87	3.14	2.72	3.01	2.48	3.09	3.19	5.22	3.38	2.24	4.32	4.29	3.33
Ratings-based (0.2/0.1)	2.38	2.77	2.66	2.63	2.52	3.00	2.48	2.75	3.19	5.13	2.89	1.59	4.32	4.29	3.28
Top-level	0.29	0.77	0.59	0.66	0.20	0.24	0.30	0.63	0.70	2.83	1.20	0.00	1.62	1.26	0.98

Table 6: Production per researcher

	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherl.	Portugal	Spain	Denmark	Sweden	UK	ECB (99-02)
Number of authors	**21**	**10**	**44**	**60**	**30**	**26**	**20**	**158**	**32**	**20**	**69**	**14**	**18**	**114**	**60**
With no correction															
Equal weighting	1.62	1.30	1.93	2.02	1.67	3.27	1.65	1.99	1.78	2.30	1.70	1.21	2.06	1.81	1.53
Ratings-based (0.2/0.2)	4.00	3.80	5.55	6.33	4.53	9.85	4.10	6.15	5.69	12.00	5.74	2.71	8.89	7.75	5.10
Ratings-based (0.2/0.1)	3.86	3.60	5.14	5.30	4.20	9.81	4.10	5.49	5.69	11.80	4.90	1.93	8.89	7.75	5.03
Top-level	0.48	1.00	1.14	1.33	0.33	0.77	0.50	1.27	1.25	6.50	2.03	0.00	3.33	2.28	1.50
With correction for number of co-authors															
Equal weighting	1.14	1.08	1.66	1.65	1.41	2.42	1.32	1.75	1.50	1.84	1.28	1.11	1.54	1.31	1.24
Ratings-based (0.2/0.2)	2.59	2.87	4.48	5.09	3.88	7.17	3.32	5.20	4.53	9.33	3.94	2.50	6.37	5.46	3.83
Ratings-based (0.2/0.1)	2.47	2.67	4.10	4.22	3.56	7.13	3.32	4.58	4.53	9.16	3.19	1.79	6.37	5.46	3.77
Top-level	0.16	0.50	0.61	0.89	0.33	0.58	0.50	0.98	0.94	4.92	1.18	0.00	1.94	1.62	0.89
With correction for number of co-authors and pages															
Equal weighting	18.2	29.1	26.3	33.7	19.6	41.2	28.2	39.6	30.2	32.9	25.2	18.0	29.2	21.5	25.8
Ratings-based (0.2/0.2)	42.4	71.9	72.4	100.5	56.2	119.9	68.6	112.8	86.1	160.9	74.5	46.7	123.2	90.8	81.7
Ratings-based (0.2/0.1)	41.4	63.8	68.4	80.9	50.8	119.6	68.6	97.5	86.1	155.3	59.8	38.9	123.2	90.8	80.8
Top-level	2.4	5.5	9.4	13.1	4.3	10.8	8.5	19.8	16.9	86.4	18.6	0.0	40.6	27.6	18.0