Publication Portfolio of the Czech Economists and Problems of Rankings[1]

František TURNOVEC*

Abstract

This paper presents "micro" results of empirical analysis of 1,235 individual publication records of 1,230 economists in the Czech Republic retrieved from international databases Web of Science and EconLit for the period 1994 – 2003. Publication portfolio described by research publication flows from particular institutions to particular journals is provided. Algorithms of weighted and not-weighted rankings of institutions by research performance are proposed and applied on Czech data.

Keywords: *impact factor, lexicographic ordering, publication portfolio, ranking*

JEL Classification: A11, A14, P20

1. Introduction

More or less sophisticated methodologies of evaluation of the research productivity are being used in the European Union and United States to produce rankings of economic departments reflecting their research performance. There is no reason to expect that the same standards will not be implemented in evaluation of universities and research institutions in the new EU member states, including Czech Republic.

While the first attempt to produce national ranking of American economic research institutions can be attributed to Fusfeld (1956), a boom of national,

European and world rankings followed in the last two decades of 20th century, see e.g. Graves, Marchand and Thompson (1982), Kirman and Dahl (1994), Bauwens (1998), Kalaitzidakis, Mamuneas and Stenos (2001), Lubrano, Bauwens, Kirman and Protopopescu (2003), Dolado, Garcia-Romero and Yamarro (2003).

Analysis of research performance of individuals and institutions became one of topical problems of scientometrics, relatively new discipline focused on measuring and analysing science. Plenty of methods were suggested and applied, including operations research approaches and multi-criteria decision making (see e.g. analysis of country rankings in Kocher, Luptacik, Sutter (2006)). A comprehensive survey of research performance evaluation methods is provided in Gregor (2006).

Surprisingly very little is known about publication performance and publication habits of the Czech economists: demanding methods of research performance evaluation have not yet became a part of academic culture in the Czech Republic. First steps in this direction appeared only during last few years. Partial analysis of publications of Czech economists during 1993 – 2000 based on records retrieved from database RIV see in Turnovec (2002). A survey of thematic orientation of economic articles published by authors from the Czech Republic compared to the rest of Europe see in Macháček (2004).

The first attempt, focused on comparative research performance of the Czech economists, took place in 2004 – 2006 within the project of the Grant Agency of the Czech Republic *Microeconomics of University Education and Measuring Research Performance of the Universities*. Methodology and aggregated results of evaluation of all over publication and citation performance of the Czech economic community (both on institutional and individual level) for the period 1994 – 2003 were published in Turnovec (2005). Műnich (2006) in his comment criticized egalitarian approach of used methodology and proposed to introduce categories of "core economics" journals and "broad-economics" journals, leading to different (more elitist) ranking results with focus on quality of publications. Publication performance of the professors of economics promoted during 1998 – 2005 was studied by Macháček and Kolcunová (2005). Analysis of Slovak economists and research institutions performance was provided in Ciaian, Pokrivčák and Rajčániová (2005). The broader context of used Czech and Slovak methodologies was examined in Gregor and Schneider (2005).

In this paper we present "micro" results of empirical analysis of 1,235 individual publication records of the economists in the Czech Republic retrieved from international databases Web of Science and EconLit. We are trying to answer the following question: what is the portfolio of target journals of the Czech economics researchers? Second part of the paper attempts to formulate a more general model of ranking problem. Different types of rankings are proposed

within the same conceptual framework covering both elitist and egalitarian approaches. Their application to existing data leads to alternative rankings expressing different perceptions of "quantity versus quality" problem.

2. Empirical Data

Main objective of the project was to compare measurable research outputs of the faculties of economics, institutes and/or departments of economics at non-economic faculties or non-university economic research institutions measured by their presence at international academic markets in the period of 10 years, 1994 – 2003.

Publication output was defined as a bibliographic record in international databases (Econlit, Web of Science). After excluding editorial notes, book reviews, conference reports, obituaries and similar non-research contributions, we analyzed a total of 1,235 articles of the Czech economists (papers in scientific journals and chapters in books) recorded by Web of Science and EconLit. We did not restrict the search on journals and other sources classified as "economics", any research publication of authors considered was included (mathematics, political sciences, sociology, and even medicine). In the case of duplicity records (the same record in Web of Science and EconLit) such record was considered only once. 1,216 economists were included affiliated with 24 Czech Republic academic institutions engaged in economic research and education (including non-Czech citizens with permanent position in the Czech institutions) and 14 "free lancers" (economists affiliated with public service institutions, financial institutions etc.). Among 1,230 economists considered only 251 (slightly more than 20%) had at least one record in publication databases.

For the purpose of this paper we concentrated attention on research productivity of 20 public faculties of economics and university institutes/departments of economics on non-economics faculties (see Table 1), employing 1141 pedagogical and research faculty. The complement of 89 economists not affiliated with public university institutions we aggregated into one group, "others" (the research fellows of Czech National Bank, department of econometrics of UTIA, Newton College, Centre of Economic Studies of VSEM and not-affiliated).[2]

---

[2] There are always plenty of technical difficulties in this type of data processing. One of them is the problem of the correct assignment of papers to right authors. For example, there are hundreds of Schneiders or Urbans over the world, some of them with the same first names. In this case we used very primitive "manual" ways of correct identification (checking websites of institutions, abstracts, text and references of the papers mostly available on internet, or personal inquiries). Another problem was to identify correct affiliation of individual authors to institutions. The changes in affiliation of individuals with evaluated institutions during the analyzed period were not considered, affiliation at the end of 2003 was significant. Also multiple affiliations were ignored; each author was allocated to a single institution, based on the permanent (full-time) contract.

T a b l e 1

Institutions Considered

Institution	Faculty	Abbreviation
UK v Praze, Institut ekonomických studií FSV	22	UK FSV IES
UK v Praze, Centrum pro ekonomicky výzkum a doktorské studium & AVČR, Národohospodářský ústav	21	CERGE-EI
VŠE, Fakulta financí a účetnictví	78	VSE FFU
VŠE, Fakulta mezinárodních vztahů	78	VSE FMV
VŠE, Fakulta podnikohospodářská	86	VSE FPH
VŠE, Fakulta informatiky a statistiky	85	VSE FIS
VŠE, Fakulta národohospodářská	38	VSE FNH
VŠE, Fakulta managementu	35	VSE FM
MU Brno, Ekonomicko-správní fakulta	26	MU ESF
Univerzita Pardubice, Fakulta ekonomicko-správní	65	UP FES
Univerzita Hradec Králové, Fakulta informatiky a managementu	13	UHK FIM
VŠB – TU Ostrava, Ekonomická fakulta	144	VSB EF
Západočeská univerzita, Fakulta ekonomická	54	ZCU FE
Jihočeská univerzita, ekonomické katedry Zemědělské fakulty	46	JCU FZ
Technická univerzita v Liberci, Hospodářská fakulta	36	TUL HF
Slezská univerzita v Opavě, Obchodně podnikatelská fakulta	42	SUO OPF
Univerzita Tomáše Bati ve Zlíně, Fakulta managementu a ekonomiky	57	UTB FME
Česká zemědělská univerzita, Provozně ekonomická fakulta	111	CZU FPE
Mendelova zemědělská a lesnická univerzita v Brně, Provozně ekonomická fakulta	75	MZU FPE
Univerzita J. E. Purkyně, Fakulta sociálně ekonomická	29	UJEP FSE
Others (CNB, UTIA, CES VSEM, Newton College, not affiliated)	89	Others

To involve qualitative aspects of assessment of publications we used for each journal publication record so called impact factor. Impact factor, invented by Garfield (1972), is a measure of the frequency with which the "average article" in a journal has been cited in a particular time period. In this sense it provides information about "impact" or scientific influence of the journal. While impact factor itself is not an assessment of a particular paper, but of the journal, it is plausible to expect that a paper published in the journal with higher impact factor has higher chance to be noticed and used by other researchers than a paper published in the journal with lower impact factor. We used so called two-year impact factor (IF2) from year 2003 by Journal Citation Reports (JCR)[3]. For journal *J* it is defined as follows:

$$IF_J = \frac{number\ of\ 2003\ citations\ of\ articles\ published\ in\ J\ during\ 2001-2002}{total\ number\ of\ articles\ published\ in\ J\ during\ 2001-2002}$$

Composition of faculty in examined institutions was based on the lists of people in research and/or teaching positions submitted by the institutions; only in cases when institutions did not respond to the request to provide the lists, web sites of institutions were used. Detailed description of used methodology see in Turnovec (2004a) and (2004b).

[3] Journal Citation Reports, published by Thomson Scientific (Institute for Scientific Information), covers over 7,500 of the world's most highly cited, peer-reviewed journals in approximately 200 disciplines. The database is regularly updated on the basis of extensive evaluation process. The necessary (but not sufficient) conditions for inclusion a journal are article titles in English, English abstracts, and keywords.

All publication records retrieved from Web of Science database are reporting publications in journals with non-zero impact factors. We also used the EconLit database reporting also articles in selected not-impacted journals[4] and books/chapters from books selected on the basis of Annotated Listing of New Books from Journal of Economic Literature, dissertations defended at American universities and working papers of selected institutions. Only production of prestigious academic publishers (Academic Press, Springer, Kluwer, Edward Elgar, McMillan etc.) is included.

3. Publication Portfolio

In Tables 2 – 5 we list all impacted journals with at least one record of publication of the Czech economists sorted by institutions from Table 1. Column IF in the tables stands for the impact factor of the corresponding journal.

Impacted journals are sorted into four clusters by their impact factors: cluster A – journals with impact factors greater than 1 (Table 2), cluster B – journals with impact factors between 0,5 and 1 (Table 3), cluster C – journals with impact factor between 0,25 and 0,5 (Table 4) and cluster D – journals with positive impact factors less than 0,25 (Table 5). Table 5 includes also not-impacted reported publications, separately in Prague Economic Papers and "others" (mostly chapters in books recorded in EconLit). Eventual co-authorship and size of publications are not considered.[5]

T a b l e 2
Cluster A, Publications in Impacted Journals with Impact Factor Greater than 1 (1994 – 2003)

Journal	IF	CERGE-EI	UK FSV IES	VSE FM	CZU FPE	Others	Total
Addiction	3.241	1					1
Journal of Economic Perspectives	2.677	2					2
Industrial & Labor Relations Review	1.301	1					1
Review of Economics and Statistics	1.266	2				1	3
Scientometrics	1.251		3				3
Journal of Democracy	1.240					1	1
Interantional Journal of Medical Informatics	1.178			1			1
Journal of Econometrics	1.135	1					1
Journal of Urban Economics	1.068	1					1
Sociology of Ecucation	1.048					1	1
Livestock Production Science	1.028				1		1
European Economic Review	1.021	2				1	3
Journal of Applied Probability	1.014					1	1
Total		10	3	1	1	5	20

---

[4] Prague Economic Papers is the only Czech not impacted journal included in EconLit database.

[5] We are providing full list of target journals, considering information about flows of the papers interesting by itself, indicating topical spectrum of the research production of economists in the CR.

Table 3
Cluster B, Publications in Impacted Journals with Impact Factor Among 0.5 and 1 (1994 – 2003) see attachment at the end of the file

Table 4
Cluster C, Publications in Impacted Journals with Impact Factor Among 0.25 and 0.5 (1994 – 2003) see attachment at the end of the file

Table 5
Cluster D, Publications in Journals with Impact Factor Less Than 0.25 (1994 – 2003)
see attachment at the end of the file

T a b l e 5 – **Continue**
see attachment at the end of the file

4. Problems of Rankings

Many different ways how to rank institutions, countries, journals, individuals on the basis of their research activities, publications, intellectual influence etc. had been proposed, implemented and discussed. There is no generally accepted methodology. In this section we formulate problem of ranking as a general mathematical problem, introduce various ranking rules, propose lexicographical ranking based on classification of activities (outputs) into different qualitative groups and apply several ranking procedures on our empirical data.[6]

4.1. Ranking Problem

Let
I – be a set of ranked units ($i = 1, 2, \ldots, n$),
M – a set of activities ($j = 1, 2, \ldots, m$),
Π – a set of all partitions of I,
O – a set of all orderings = set of all permutations of partitions from Π.

By

$$\boldsymbol{x}_i = (x_{i1}, x_{i2}, \ldots, x_{im})$$

we shall denote the i-th activity vector, vector of intensities of activities of unit i, and by

$$\boldsymbol{x} = (x_1, x_2, \ldots, x_n)$$

collection of activity vectors of all units. We assume that $x_{ij} \geq 0$, so $\boldsymbol{x}_i \in R_m^+$ and $\boldsymbol{x} \in X$ where
X is n-tuple Cartesian product of R_m^+, the space of collections of activity vectors. The system

$$\{I, M, O, X\}$$

we shall call a general ranking problem.

Let

$$F : X \to O$$

be a mapping of the space X of all collections of activity vectors into the set of orderings. This mapping, assigning to any $\boldsymbol{x} \in X$ an ordering from O we shall term a ranking rule – any rule describing how to choose from O on the basis of X.

There exist many ranking rules, ways how to select an ordering on the basis of collection of activity vectors.

---

[6] Terminological comment: by ranking we shall call process of evaluation itself, result of this process being an ordering.

4.2. Ranking of Publication Media, Impact factors

Let

$\Im$ – be a universe of media (journals etc.),

$J \subseteq \Im$ – finite subset of media, taken into consideration in evaluation,

$c_{ij}(T1, T2)$ – number of citations of articles published in medium i in period $T1$ cited by medium j during a considered period $T2$,

$a_i(T1)$ – number of articles published in medium i in a considered period $T1$ connected time intervals such that $T1$ precedes $T2$ [e.g. $T1 = (r1, r2)$, $T2 = (r3, r4)$, $r3 \geq r2 + 1$, $r4 \geq r3$, $r1 \leq r2$, r are the years].

Then

$$\sum_{j \in J} c_{ij}(T_1, T_2)$$

is the number of all citations of articles published in medium i in period $T1$ in all media $j \in J$ in period $T2$, and

$$\Phi_i(J, C, a, T_1, T_2) = \frac{\sum_{j \in J} c_{ij}(T_1, T_2)}{a_i(T_1)}$$

assigns to each medium a value that expresses an average number of citations of its articles published in $T1$ in medias J in period $T2$. Value Φi is usually called an $(T1, T2)$-impact factor of media i, measuring a relative influence of the journal i. Depending on selection of $T1$ and $T2$ we obtain different impact factors. Auto-citations might be excluded, but it is usually not the case. Impact factor mapping without auto-citations:

$$\Phi_i(J, C, a, T_1, T_2) = \frac{\sum_{j \in J, i \neq j} c_{ij}(T_1, T_2)}{a_i(T_1)}$$

Impact factor mapping Φ defines an ordering $J(\Phi)$ of the set J of the media

$$J(\Phi) = (J1(\Phi), \dots, Jk(\Phi), \dots, Jn(\Phi))$$

where $n \leq$ card (J) such that $\Phi r > \Phi s$ for any $s > r$, providing the ranking of media (groups of media with the same impact factor).

4.3. Ranking of Research Performance

As before, let

$J \subseteq \Im$ – be a finite subset of media, taken into consideration in evaluation,

I – set of units to be evaluated (institutions, individuals etc.),

P_{ij} – set of publications of unit $i \in I$ in medium $j \in J$,

R – ranking structure (a partition of J defining a ranking on J),

n_i – number of agents in unit $i \in I$.

a) Not-weighted Rankings

Let

$$R = (R_1, \ldots, R_k, \ldots, R_n)$$

be a ranking structure such that for any $r < t$ a publication in R_s is considered "more valuable" than publication in R_t. Sets R_k we shall term ranking categories. Let us denote $p_{ij} = \text{card } P_{ij}$, then

$$p_i(R_k) = \sum_{j \in R_k} p_{ij}$$

is a number of publications of unit i in ranking category R_k, and vector

$$\mathbf{p}_i(R) = (p_i(R_1), p_i(R_2), \ldots, p_i(R_n))$$

we shall call an (absolute) publication portfolio of unit i with respect to a ranking structure R.

Then

$$\pi_i(R_k) = \frac{1}{n_i} p_i(R_k)$$

is "per capita" ("per agent") number of publications of unit i in category R_k and

$$\boldsymbol{\pi_i}(R) = (\pi_i(R_1), \pi_i(R_2), \ldots, \pi_i(R_n))$$

we shall call a relative publication portfolio of unit i with respect to ranking structure R. Then, we can define a ranking partition on I in such a way that for any $u, v \in I$

$$u \succ v \text{ if and only if } \mathbf{p}_u(R) \underset{R}{lex} > \mathbf{p}_v(R)$$

(lexicographical ordering). If $\boldsymbol{x}, \boldsymbol{y} \in R_n$, then $\boldsymbol{x} \ lex > \boldsymbol{y}$ if the first non-zero element of $\boldsymbol{x} - \boldsymbol{y}$ is positive.

Choice of J and of ranking partition R determines a level of elitism/egalitariannism of ranking. For example, definition of J as the set of all publication in EconLit database produces less elitist ranking than selection of J on the basis of records in Web of Science. Selection of R with $R1$ consisting of 8 "most prestigious" journals (American Economic Review, Journal of Economic Theory, Econometrica, Journal of Political Economy, Quarterly Journal of Economics, Review of Economic Studies, International Economics Review, Review of Economics and Statistics – so called "blue ribbon 8", Dusansky and Vernon 1998) generates the most elitist ranking independently on how other categories R_k are defined. On the other hand choice of $J = \Im$ and $R_1 = J$ generates the most egalitarian ranking. One of the possible ranking structures is classification of journals on "core economics" and "broad economics" (as in Műnich, 2006).

b) Weighted Rankings

Frequently there is a call for more detailed differentiation by weighting each individual publication. Problem is how to select the weights.

The simplest way is to use impact factors of journals in which publications appeared. . Using impact factor journal partition $J(\Phi)$ with weights of publications equal to impact factors, we have

$$w_i(R) = \sum_{k=1}^{m} \sum_{j \in J_k(\Phi)} \Phi_j p_{ij}$$

the total score (sum of impact factors of all publications of unit i), where m is the size of impact factor partition (number of groups of media with the same impact factor), and

$$\omega_i(R) = \frac{1}{n_i} \sum_{k=1}^{m} \sum_{j \in J_k(\Phi)} \Phi_j p_{ij}$$

"per capita" score of unit i.

We can combine impact factor weights with lexicographical ranking based on any ranking partition R. If in partition R each category is a subset of J, and p_{ijt} is a number of publications of unit i in ranking category R_k published in media from the group $J_t(\Phi)$, we have

$$w_i(R_k) = \sum_{t=1}^{m} \sum_{j \in R_k} \Phi_t p_{ijt}$$

(total score of unit i in category R_k), and

$$\omega_i(R_k) = \frac{1}{n_i} \sum_{t=1}^{m} \sum_{j \in R_k} \Phi_t p_{ijt}$$

("per capita" score of unit i in category R_k).

5. Application of Different Ranking Rules on Czech Data 1994 – 2003

In empirical analyses based on ranking categories A, B, C and D we are using four ranking rules:

a) Simple not-weighted ranking using trivial ranking structure $R = (A \cup B \cup C \cup D\}$, i.e. one ranking category consisting of all recorded publications, ordering by per capita number of publications. Institution x is "better" than institution y if it has more per capita publications than y. The most egalitarian rule, quality factor not considered.

b) Simple weighted ranking using trivial ranking structure $R = (A \cup B \cup C \cup D\}$, i.e. one ranking category consisting of all recorded publications, weights equals to impact factors of journals where publications appeared, ordering by per capita score (sum of impact factors of all publications per one faculty member); institution x is better than institution y if it has greater per capita score generated by all publications than institution y. Here not impacted publications are not considered, quality aspect introduced by impact factors.

c) Not-weighted lexicographical ranking using nontrivial ranking structure $R = = (A, B, C, D)$, ordering by per capita number of publications in different categories using lexicographical rule: (i) institution x is better than institution y if x has more per capita publications in A than y has independently on how many publications it has in other categories; (ii) if x and y have the same number of per capita publications in A, than institution x is better than institution y if it has more per capita publications in B, independently on how many publications it has in categories C and D, etc. All publications considered including not--impacted ones. Quality aspect introduced by nontrivial ranking structure.

d) Weighted lexicographical ranking using nontrivial ranking structure $R = = (A, B, C, D)$ ordering by per capita score (sum of impact factors of publications per one faculty) in different categories using lexicographical rule: (i) institution x is better than institution y if x has greater per capita score generated by publications in A than y has, independently on score in other categories; (ii) if x and y have the same per capita score in A, than institution x is better than institution y if it has greater per capita score in B, independently on score it has in categories C and D, etc. Quality aspect introduced both by ranking structure and impact factor weights.

In Table 6, 7, 8 and 9 we provide these four rankings of the Czech institutions based on publication portfolio from Tables 2 – 5. Our analysis is focused on university institutions. For comparison we are providing data of group "others", not including it into the rankings.

We can see that in our case different ranking rules do not exhibit dramatic differences in ordering. In table 10 we provide comparison of different orderings. The results are more sensitive to lexicographic rules, there are more significant cardinal differences (per capita score), but top positions in all orderings are occupied by the same institutions, as well as the bottom positions.[7]

---

[7] The author is aware of the fact that orderings according relative score might be influenced by used size of faculty, taken by investigators as submitted by different institutions and not checked. On the other hand, orderings of bottom nine institutions based on relative (per capita) score are almost identical with the orderings based on absolute score (number of publications, total weighted score), while differences in number of faculty significantly vary (between 29 to 75). Only one of the bottom nine institutions has a publication (just one) in category C and two of them have zero impact score.

Table 6
Simple (Egalitarian) Not-Weighted Ranking of Institutions (All Publications Form One Group) see attachment at the end of the file

Table 7
Simple IF Weighted Ranking of Institutions (All Publications Form One Group, IF Used as Weights) see attachment at the end of the file

Table 8
Not-Weighted Lexicographical Ranking of Institutions (Ranking Structure {A, B, C, D}) see attachment at the end of the file

Table 9
IF Weighted Lexicographical Ranking of Institutions (Ranking Structure {A, B, C, D}), see attachment at the end of the file

T a b l e 10

Comparison of Different Ranking Rules (Orderings)

Order	Simple Not-weighted	Simple Weighted	Lexicographic Not-weighted	Lexicographic Weighted
1.	CERGE-EI	CERGE-EI	CERGE-EI	CERGE-EI
2.	UK FSV EIS	UK FSV IES	UK FSV EIS	UK FSV IES
3.	VSE FNH	VSE FNH	VSE FM	VSE FM
4.	VSE FFU	VSE FFU	CZU FPE	CZU FPE
5.	UHK FIM	VSE FIS	UHK FIM	UHK FIM
6.	VSE FIS	VSE FMV	VSE FNH	VSE FNH
7.	VSE FMV	VSE FM	VSE FIS	VSE FIS
8.	MU EF	MU EF	VSE FPH	VSE FPH
9.	VSB EF	UHK FIM	VSB EF	VSB EF
10.	VSE FPH	VSB EF	MU EF	MU EF
11.	VSE FM	VSE FPH	VSE FFU	VSE FFU
12.	TUL HF	CZU FPE	VSE FMV	VSE FMV
13.	SUO OPF	TUL HF	SUO OPF	SUO OPF
14.	CZU FPE	JCU FZ	TUL HF	TUL HF
15.	UJEP FSE	SUO OPF	UJEP FSE	JCU FZ
16.	JCU FZ	MZU FPE	JCU FZ	MZU FPE
17.	UTB FME	UJEP FSE	UTB FME	UJEP FSE
18	UP FES	ZCU FE	UP FES	ZCU FE
19.	MZU FPE	UP FES	MZU FPE	UP FES
20.	ZCU FE	UTB FME	ZCU FE	UTB FME

6. Concluding Remarks

The paper, of course, has no ambition to present all possible ranking rules. For example, recently used ranking methodology of Council of Government of the Czech Republic for Research and Development is using its own scheme of publication and development outputs evaluation with respect to research funding (Cahlík and Pessrová, 2005). Publications and other outputs are classified into 13 groups (ranking categories) and each group has its weight, also results of development (as patents, technologies etc.) are included (see Table 11).

T a b l e 11

Ranking Category		Weight w_i
R1	Papers in impacted journals non Czech or Slovak	4 + (10*IF)/(median IF)
R2	Papers in impacted journals in Czech or Slovak	1 + (10*IF)/(median IF)
R3	Papers in refereed not impacted journals non Czech or Slovak	4
R4	Papers in refereed not impacted journals Czech or Slovak	1
R5	Scientific book non Czech or Slovak	20
R6	Scientific book Czech or Slovak	5
R7	Chapter in scientific book non Czech	6
R8	Chapter in scientific book Czech or Slovak	1
R9	Chapter in proceedings non Czech or Slovak	4
R10	Chapter in proceedings Czech or Slovak	1
R11	Technology, applied methodology, software product etc.	25
R12	National patent	50
R13	European or world patent	100

Weighted score is defined as

$$\frac{\sum_{k=1}^{13} w_k t_{ik}}{r_i}$$

where w_k is the weight of one output in category k, t_{is} is the number of outputs of institution i in category k, r_i is the government budget subsidy spent in institution i for research projects in particular period. Quality in this ranking is introduced by weights. One understands that any recognized ranking rule is result of a difficult compromise of different professional groups representing different disciplines and institutions, where group interests and habits are involved. Median normalization makes possible to compare different research disciplines with different scales of impact factors. But the constants in particular weights are rather arbitrary and shifted in favor of books that are in many disciplines (including economics) not considered by international standards to be a part of research production, but rather a compilation or synthesis of research results published in recognized journals. Another weak point of this method is source of data: local RIV database is updated by authors themselves and de facto the only criterion for inclusion into the database is existence of ISSN or ISBN of publication media. Clear definition of refereed journals is missing and in the case of books peer review process is perhaps implicitly assumed, but not explicitly required. Except of that, parameters are changing from year to year, and domestic budget subsidies are a bad proxy for financing research (e.g. international grants and private sector subsidies are not considered).[8]

While in declarative dimension nobody questions the quality factor is to be included in any type of evaluation, there is no consensus in quality indicators. As a proxy for quality of publication (or research result) is usually used impact factor of journal of publication. The reason for that is first of all the serious peer reviewing process as a necessary condition for a journal to be included into the list of considered journals, and objectively evaluated influence of the journal measured by relative number of citations of its publications by other journals.

On the other hand there exist legitimate objections to impact factor as an indicator of quality of a particular publication (see e.g. Garfield, 2005; Špála, 2006). Impact factors undoubtedly indicate the scientific influence of the journals, but only indirectly the influence of publication (they rather say something

---

[8] It would be interesting to compare results of ranking by Czech Government methodology with our results. The problem is that the time intervals are different (while our data cover period 1994 – 2003, Government methodology was introduced in 2002). Preliminary analysis shows that the weight of impacted publications score in total Government score oscillates between 0% to 50%, average is 5%.

about the ability of the author to get the paper into a good journal). On the other hand, frequently used argument is about "national dimension" of some sciences with research results being of interest only for narrow domestic scientific community and having no space on international academic market (usually social sciences and humanities are active in this argumentation). Then the questions are: Include into evaluation publications in not impacted journals, and if yes, with what weights? Include into evaluation books and chapters in books that are not participating in impacting process at all, and if yes, with what weights?

One way how to solve this dilemma is e.g. to use the similar evaluation process for publications as for the journals, i.e. to measure scientific influence or impact of a publication independently of where it appeared by number of its citations in impacted journals. Let c_{ij} be the number of citations of a paper i by journal j (from the list of impacted journals) and f_j be impact factor of j. Then the weight (impact factor) of publication i could be defined as

$$w_i = \sum_{j \in J} c_{ij} f_j$$

where J is the set of impacted media.

In the same direction goes Hirsch (2005) proposal of so called H-index. An individual has a research performance index H if h of his/her n papers have at least h citations each and the other $n - h$ papers have at most h citations each. First empirical analyses of H-index characteristics of the Czech economists were presented by Cahlík and Pessrová (2006) and Macháček and Kolcunová (2006, 2007). There are more ways how to extend the H-index concept for evaluation of institutions. The most straightforward one is to define H-index of an institution as the number h of publications of the institution members having at least h citations each when other publications have at most h citations each.

Both of these approaches (impact factor of publication and H-index) bring into the evaluation game good quality not impacted publications. However, the price of that is very high complexity of data processing.

Another possibility is a compromise between simple not-weighted rule and simple weighted rule with weight of publication i in media j

$$w_{ij} = \alpha + (1 - \alpha) f_j$$

where α is a weight of record (presence in database) and $(1 - \alpha)$ is the weight of quality of media of publication measured by impact factor, $0 \leq \alpha \leq 1$, providing that used database records not only impacted journals, but also not-impacted media (as it is in EconLit or Google Scholar). This system was used in original research reported in this paper (Turnovec, 2005) with $\alpha = 0,5$, but another choice of α is possible (e.g. minimal impact factor of journals from J).

Research of ranking rules should continue to provide some general axioms that might bring more objectivity into discussions on "what ranking rules are the right ones". It is always easier to agree on general principles than on some ad hoc counts. Palacios-Huerta and Vold (2004) presented useful ideas and definitions that can bring more light into this controversial dispute.

Rankings have strong motivation effects, providing signals for individuals and institutions, cultivating publication habits and setting up good guidelines for PhD. students. It is important to reach consensus about selected ranking rules, perhaps on the basis of Professional societies (such as Czech Economic Society), grant agencies etc. Any systematically used ranking rule is better than nothing.

References

[1] BAUWENS, L. (1998): A New Method to Rank University Research and Researchers in Economics in Belgium. [CORE Discussion Paper.] Louvain: CORE.

[2] CAHLÍK, T. – PESSROVÁ, H. (2006): Using the H-index to Measure Czech Economic Research and Czech Researchers Habits Related to Research Papers. [Presented at: 4. výroční konference České společnosti ekonomické.] Praha, 25. 11. 2006.

[3] CAHLÍK, T. – PESSROVÁ, H. (2005): Hodnocení pracovišť výzkumu a vývoje. [Working Paper, No. 87.] Praha: UK FSV – IES.

[4] CIAIAN, P. – POKRIVČÁK, J. – RAJČÁNIOVÁ, M. (2005): Stav ekonomickej vedy na Slovensku. Finance a úvěr – Czech Journal of Economics and Finance, *55*, No. 11 – 12, pp. 546 – 562.

[5] DOLADO, J. J. – GARCIA-ROMERO, A. – ZANARRO, G. (2003): Publishing Performance in Economics: Spanish Rankings (1990 – 1990). Spanish Economic Review, *5*, pp. 85 – 103.

[6] DUSANSKY, R. – VERNON, C. J. (1998): Ranking of U.S. Economic Departments. Journal of Economic Perspectives, *12*, No. 1, pp. 157 – 170.

[7] FUSFELD, D. R. (1956): The Program of the American Economic Meetings. American Economic Review, *46*, pp. 642 – 644.

[8] GARFIELD, E. (1972): Citation Analysis as a Tool in Journal Evaluation. Science, *178*, pp. 471 – 479.

[9] GARFIELD, E. (2005): The Agony and the Ecstasy, the History and Meaning of the Journal Impact Factor. [International Congress on Peer Review and Biomedical Publications.] Chicago, Sept. 16, 2005 <www.eugenegarfield.org>.

[10] GRAVES, P. E. – MARCHAND, J. E. – THOMPSON, R. (1982): Economics Departmental Rankings: Research Incentives, Constraints and Efficiency. American Economic Review, *72*, No. 5, pp. 1131 – 1141.

[11] GREGOR, M. – SCHNEIDER, O. (2005): The World is Watching: Rankings of Czech and Slovak Economics Departments. Finance a úvěr – Czech Journal of Economics and Finance, *55*, No. 11 – 12, pp. 518 – 530.

[12] GREGOR, M. (2006): Hodnocení ekonomických pracovišť a ekonomů: koho, proč, čím a jak. Politická ekonomie, *LIV*, No. 3, pp. 394 – 414.

[13] HIRSCH, J. E. (2005): An Index to Quantify an Individual's Scientific Research Output. [Proceedings of the National Academy of Sciences of the United States of America, Vol. 102, No. 46.] La Jolla: University of California at San Diego, pp. 16569 – 16572.

[14] KALAITZIDAKIS, P. – MAMUNEAS, T. P. – STENOS, T. (2003): Ranking of Academic Journals and Institutions in Economics. Journal of the European Economic Association, *1*, No. 6, pp. 1346 – 1366.

[15] KIRMAN, A. – DAHL, M. (1994): Economic Research in Europe. European Economic Review, *38*, pp. 505 – 522.

[16] KOCHER, M. G. – LUPTÁČIK, M. – SUTTER, M. (2006): Measuring Productivity of Research in Economics: A Cross-Country Study Using DEA. Socio-Economic Planning Sciences, *40*, No. 4, pp. 314 – 332.

[17] LUBRANO, M. – BAUWENS, L. – KIRMAN, A. – PROTOPOPESCU, C. (2003): Ranking Economics Departments in Europe: A Statistical Approach. Journal of the European Economic Association, *1*, No. 6, pp. 1367 – 1401.

[18] MACHÁČEK, M. (2004): Komparace tematické struktury časopiseckých publikací českých a evropských ekonomů. Politická ekonomie, *LII*, No. 1, pp. 74 – 90.

[19] MACHÁČEK, M. – KOLCUNOVÁ, E. (2005): Jak se v ČR žije kandidátům na docenty a profesory? Analýza publikačních aktivit v ekonomických disciplínách. Finance a úvěr – Czech Journal of Economics and Finance, *55*, No. 11 –12, pp. 563 – 577.

[20] MACHÁČEK, M. – KOLCUNOVÁ, E. (2006): Hirschovo číslo a Turnovcův citační žebříček ekonomů. [Presented at: 4. výroční konference České společnosti ekonomické.] Praha, 25. 11. 2006.

[21] MACHÁČEK, M. – KOLCUNOVÁ, E. (2007): Hirschovo číslo a žebříčky českých ekonomů. [Manuscript, to appear in Politická ekonomie.]

[22] MÜNICH, D. (2006): Measuring Economics Research in the Czech Republic, a Comment. Finance a úvěr – Czech Journal of Economics and Finance, *56*, No. 11 – 12, pp. 522 – 533.

[23] NEARY, J. P. – MIRRLEES, J. A. – TIROLE, J. (2003): Evaluating Economics Research in Europe: an Introduction. Journal of the European Economic Association, *1*, No. 6, pp. 1239 – 1249.

[24] PALACIOS-HUERTA, I. – VOLD, O. (2004): The Measurement of Intellectual Influence. Econometrica, *72*, No. 3, pp. 963 – 977.

[25] ŠPÁLA, M. (2006): Impakt faktor – dobrý sluha ale špatný pán. Časopis lékařů českých, *145*, pp. 69 – 78.

[26] TURNOVEC, F. (2005): Institucionální vědecký kapitál a individuální výkonnost ekonomů v ČR. Finance a úvěr – Czech Journal of Economics and Finance, *55*, No. 11 – 12, pp. 531 – 546.

[27] TURNOVEC, F. (2002): Economics in the Czech Republic. In: KAASE, M. and SPARSCHUH, V. (eds.): Three Social Science Disciplines in Central and Eastern Europe. Berlin: Social Science Information Centre, pp. 50 – 64.

[28] TURNOVEC, F.: (2004a): Economic Research in the Czech Republic: Entering International Academic Market. In: Quantitative Methods in Economics. Bratislava: Slovak Society for Operations Research, pp. 187 – 194.

[29] TURNOVEC, F. (2004b): Česká ekonomická věda na mezinárodním akademickém trhu: měření vědeckého kapitálu vysokoškolských a dalších výzkumných pracovišť. In: KOTÁBOVÁ, V., PRAŽOVÁ, I. and SCHNEIDER, O. (eds.): Rozvoj české společnosti v Evropské unii. Praha: Matfyzpress, pp. 77 – 84.

Table 3
Cluster B, Publications in Impacted Journals with Impact Factor Among 0.5 and 1 (1994 – 2003)

Journal	IF	CERGE-EI	UK FSV IES	VSE FNH	VSE FIS	VSE FPH	VSE FM	VSB EF	CZU FPE	UHK FIM	Others	Total
International Journal of Intelligent Systems	0.875						1					1
Rationality and Society	0.867	1										1
Journal of Business Venturing	0.852										1	1
International Economic Review	0.840	1										1
Annals of Mathematics and Artificial Intelligence	0.837						1					1
Journal of Development Economics	0.832	2										2
Oxford Economic Papers-New Series	0.824	1										1
Pattern Recognition Letters	0.809								1			1
Journal of Public Economics	0.786	1										1
Journal of Evolutionary Economics	0.778										1	1
Journal of Comparative Economics	0.746	3									4	7
Computational Statistics & Data Analysis	0.711		1									1
Environmental & Resource Economics	0.702			2								2
Journal of European Social Policy	0.700										1	1
Regional Science and Urban Economics	0.694	1										1
Journal of Economic Dynamics & Control	0.690	1	1							1		3
Post-Soviet Geography and Economics	0.677		1									1
International Journal of Game Theory	0.653	1										1
European Journal of Operational Research	0.605		1		1			1				3
Review of Economic Dynamics	0.600	1										1
Journal of Optimization Theory and Applications	0.583										1	1
Cybernetics and Systems	0.581				1							1
Journal of Business Ethics	0.580										2	2
Management Learning	0.568					1						1
Journal of Economic Behavior & Organization	0.566	3										3
Rural Sociology	0.561										1	1
Small Business Economics	0.534										1	1
Total		16	4	2	2	1	2	1	1	1	12	42

T a b l e 4
Cluster C, Publications in Impacted Journals with Impact Factor Among 0.25 and 0.5 (1994 – 2003)

Journal	IF	CERGE-EI	UK FSV IES	VSEF NH	VSEF FU	VSEF IS	VSEF M	VSEF MV	VSB EF	MUEF	SUO OPF	CZUF PE	Others	Total
Europe-Asia Studies	0.475							1						1
Annals of the Institute of Statistical Mathematics	0.468		2											2
Kyklos	0.449	1												1
Russian and East European Finance and Trade	0.444				2								1	3
Journal of Institutional and Theoretical Economics	0.407	1												1
Sociological Quarterly	0.397												1	1
Journal of Agricultural Economics	0.390		2											2
Journal of Futures Markets	0.390												1	1
Journal of Higher Education	0.375	1												1
Journal of Economic Issues	0.373									2				2
Economics of Transition	0.367	6						1					5	12
Southern Economic Journal	0.361	2												2
Nonprofit and Voluntary Sector Quarterly	0.355	1												1
Comunist and Post-Communist Studies	0.340		1										1	2
Economics Letters	0.337	1												1
Fuzzy Sets and Systems	0.323												4	4
Kybernetika	0.319	1	2			2						1	10	16
Journal of Computational and Applied Mathematics	0.312												1	1
Discrete Mathematics	0.303											1		1
Economic Inquiry	0.301	2												2
Zeitschrift fur Angewandte Mathematik und Mechanik	0.301												4	4
Public Choice	0.297	1											1	2
Eastern European Economics	0.293	2		2	2				3		1		31	41
Computational Statistics	0.282		1				1							2
Emerging Markets Finance and Trade	0.273	1	1											2
Current Psychology of Cognition	0.255	1												1
International Journal of Uncertainty	0.252												1	1
Total		21	9	2	4	2	1	2	3	2	1	2	61	110

Table 5
Cluster D, Publications in Journals with Impact Factor Less Than 0.25 (1994 – 2003)

Journals	IF	CERGE-EI	UK FSV IES	VSE FNH	VSE FFU	VSE FIS	VSE FPH	VSE FM	VSE FMV	VSB EF	MU EF
Journal of Economic Education	0.239	1									
Economic Modelling	0.236										
Politická Ekonomie	0.235	21	31	35	39	51	12		29	10	5
Československá psychologie	0.232										
Czech Journal of Animal Science	0.217										
International Tax and Public Finance	0.215				2						
Computational Intelligence	0.203										
Statistical Papers	0.203					2					
Applied Economics	0.200	2									
Journal of Political & Military Sociology	0.200										
Journal of Macroeconomics	0.179	1									
International Journal of General Systems	0.172							1			
History of Political Economy	0.142	1									
Finance a úvěr	0.112	21	27	2	20	2	1	1	1	19	2
Control and Cybernetics	0.101		1						3		
Sociologický časopis	0.063										
Ekonomický časopis	0.062	1	1	1	1	1	1		4	3	2
Studies in Nonlinear Dynamics and Econometrics	0.034	1									
Prague Economic Papers	0	9	15	6	9	9	4		6		
Others not impacted	0	77	65	4	4	12	6	2	18	29	2
Total		135	140	48	75	77	24	4	61	61	11

T a b l e 5 – **Continue**

Journals	TUL HF	SUO OPF	JCU FZ	CZU FPE	MZU FPE	UJEP FSE	ZCU FE	UP FES	UHK FIM	UTB FME	Others	Total
Journal of Economic Education											0	1
Economic Modelling									1		0	1
Politická Ekonomie	3		2	2	2	1					128	371
Československá psychologie											1	1
Czech Journal of Animal Science				3							0	3
International Tax and Public Finance											0	2
Computational Intelligence											1	1
Statistical Papers											0	2
Applied Economics											0	2
Journal of Political & Military Sociology											1	1
Journal of Macroeconomics											0	1
International Journal of General Systems											0	1
History of Political Economy											0	1
Finance a úvěr	3	1				1					141	242
Control and Cybernetics											0	4
Sociologický časopis											9	9
Ekonomický časopis/Journal of Economics		2	2					1			0	20
Studies in Nonlinear Dynamics and Econometrics											0	1
Prague Economic Papers									2		45	105
Others not impacted	0	2	0	5	1	1	0	3	9	3	51	294
Total	6	5	4	10	3	3	1	3	12	3	377	1 063

T a b l e 6
Simple (Egalitarian) Not-Weighted Ranking of Institutions (All Publications Form One Group)

Ordering	# of Publications in Groups				Total Publications	Faculty	Per capita Publications in Ranking Categories				Per capita Score Total
	A	B	C	D			A	B	C	D	
CERGE-EI	10	16	21	135	182	21	0.476190	0.761905	1	6.428571	8.666667
UK FSV EIS	3	4	9	140	156	22	0.136364	0.181818	0.409091	6.363636	7.090909
VSE FNH	0	2	2	48	52	38	0	0.052632	0.052632	1.263158	1.368421
VSE FFU	0	0	4	75	79	78	0	0	0.051282	0.961538	1.012821
UHK FIM	0	1	0	12	13	13	0	0.076923	0	0.923077	1
VSE FIS	0	2	2	77	81	85	0	0.023529	0.023529	0.905882	0.952941
VSE FMV	0	0	2	61	63	78	0	0	0.025641	0.782051	0.807692
MU EF	0	0	2	11	13	26	0	0	0.076923	0.423077	0.5
VSB EF	0	1	3	61	65	144	0	0.006944	0.020833	0.423611	0.451389
VSE FPH	0	1	0	24	25	86	0	0.011628	0	0.279070	0.290698
VSE FM	1	2	1	4	8	35	0.028571	0.057143	0.028571	0.114286	0.228571
TUL HF	0	0	0	6	6	36	0	0	0	0.166667	0.166667
SUO OPF	0	0	1	5	6	42	0	0	0.02381	0.119048	0.142857
CZU FPE	1	1	2	10	14	111	0.009009	0.009009	0.018018	0.090090	0.126126
UJEP FSE	0	0	0	3	3	29	0	0	0	0.103448	0.103448
JCU FZ	0	0	0	4	4	46	0	0	0	0.086957	0.086957
UTB FME	0	0	0	3	3	57	0	0	0	0.052632	0.052632
UP FES	0	0	0	3	3	65	0	0	0	0.046154	0.046154
MZU FPE	0	0	0	3	3	75	0	0	0	0.040000	0.04
ZCU FE	0	0	0	1	1	54	0	0	0	0.018519	0.018519
Others	5	12	61	377	455	89	0.05618	0.134831	0.685393	4.235955	5.11236
Total	20	42	110	1 063	1 235	1 230	0.01626	0.034146	0.089431	0.864228	1.004065

Simple IF Weighted Ranking of Institutions (All Publications Form One Group, IF Used as Weights)

Ordering	# of Publications in Groups				Total Publications	Faculty	Score Weighted by IF				Score Total	Per capita Score in Groups				Per capita Score Total
	A	B	C.	D			A	B	C	D	A+B+C+D	A	B	C	D	
CERGE-EI	10	16	21	135	182	21	16.673	11.554	7.179	8.343	43.749	0.793952	0.55019	0.341857	0.397286	2.083286
UK FSV IES	3	4	9	140	156	22	3.753	2.683	3.249	10.472	20.157	0.170591	0.121955	0.147682	0.476	0.916227
VSE FNH	0	2	2	48	52	38	0	1.492	0.586	8.511	10.589	0	0.039263	0.015421	0.223974	0.278658
VSE FFU	0	0	4	75	79	78	0	0	1.474	11.897	13.371	0	0	0.018897	0.152526	0.171423
VSE FIS	0	2	2	77	81	85	0	1.186	0.638	12.677	14.501	0	0.013953	0.007506	0.149141	0.1706
VSE FMV	0	0	2	61	63	78	0	0	0.842	7.478	8.32	0	0	0.010795	0.095872	0.106667
VSE FM	1	2	1	4	8	35	1.178	1.712	0.282	0.284	3.456	0.033657	0.048914	0.008057	0.008114	0.098743
MU EF	0	0	2	11	13	26	0	0	0.746	1.523	2.269	0	0	0.028692	0.058577	0.087269
UHK FIM	0	1	0	12	13	13	0	0.69	0	0.236	0.926	0	0.053077	0	0.018154	0.071231
VSB EF	0	1	3	61	65	144	0	0.605	0.879	4.664	6.148	0	0.004201	0.006104	0.032389	0.042694
VSE FPH	0	1	0	24	25	86	0	0.568	0	2.994	3.562	0	0.006605	0	0.034814	0.041419
CZU FPE	1	1	2	10	14	111	1.028	0.809	0.622	1.121	3.58	0.009261	0.007288	0.005604	0.010099	0.032252
TUL HF	0	0	0	6	6	36	0	0	0	1.041	1.041	0	0	0	0.028917	0.028917
JCU FZ	0	0	0	4	4	29	0	0	0	0.594	0.594	0	0	0	0.020483	0.020483
SUO OPF	0	0	1	5	6	42	0	0	0.293	0.236	0.529	0	0	0.006976	0.005619	0.012595
MZU FPE	0	0	0	3	3	57	0	0	0	0.47	0.47	0	0	0	0.008246	0.008246
UJEP FSE	0	0	0	3	3	46	0	0	0	0.347	0.347	0	0	0	0.007543	0.007543
ZCU FE	0	0	0	1	1	65	0	0	0	0.062	0.062	0	0	0	0.000954	0.000954
UP FES	0	0	0	3	3	75	0	0	0	0	0	0	0	0	0	0
UTB FME	0	0	0	3	3	54	0	0	0	0	.	0	0	0	0	0
Others	5	12	61	377	455	89	5.589	8.152	19.037	47.074	79.852	0.062798	0.091596	0.213899	0.528921	0.897213
Total	20	42	110	1 063	1 235	1 230	28.221	29.451	35.827	120.024	213.523	0.022944	0.023944	0.029128	0.09758	0.173596

T a b l e 8
Not-Weighted Lexicographical Ranking of Institutions (Ranking Structure {A, B, C, D})

Ordering	# of Publications in Groups				Total Publications	Faculty	Per capita Publications in Ranking categories				Per capita Score Total
	A	B	C	D			A	B	C	D	
CERGE-EI	10	16	21	135	182	21	0.47619	0.761905	1	6.428571	8.666667
UK FSV EIS	3	4	9	140	156	22	0.136364	0.181818	0.409091	6.363636	7.090909
VSE FM	1	2	1	4	8	35	0.028571	0.057143	0.028571	0.114286	0.228571
CZU FPE	1	1	2	10	14	111	0.009009	0.009009	0.018018	0.09009	0.126126
UHK FIM	0	1	0	12	13	13	0	0.076923	0	0.923077	1
VSE FNH	0	2	2	48	52	38	0	0.052632	0.052632	1.263158	1.368421
VSE FIS	0	2	2	77	81	85	0	0.023529	0.023529	0.905882	0.952941
VSE FPH	0	1	0	24	25	86	0	0.011628	0	0.27907	0.290698
VSB EF	0	1	3	61	65	144	0	0.006944	0.020833	0.423611	0.451389
MU EF	0	0	2	11	13	26	0	0	0.076923	0.423077	0.5
VSE FFU	0	0	4	75	79	78	0	0	0.051282	0.961538	1.012821
VSE FMV	0	0	2	61	63	78	0	0	0.025641	0.782051	0.807692
SUO OPF	0	0	1	5	6	42	0	0	0.02381	0.119048	0.142857
TUL HF	0	0	0	6	6	36	0	0	0	0.166667	0.166667
UJEP FSE	0	0	0	3	3	29	0	0	0	0.103448	0.103448
JCU FZ	0	0	0	4	4	46	0	0	0	0.086957	0.086957
UTB FME	0	0	0	3	3	57	0	0	0	0.052632	0.052632
UP FES	0	0	0	3	3	65	0	0	0	0.046154	0.046154
MZU FPE	0	0	0	3	3	75	0	0	0	0.04	0.04
ZCU FE	0	0	0	1	1	54	0	0	0	0.018519	0.018519
OTHERS	5	12	61	377	455	89	0.05618	0.134831	0.685393	4.235955	5.11236
Total	20	42	110	1 063	1 235	1 230	0.01626	0.034146	0.089431	0.864228	1.004065

T a b l e 9
IF Weighted Lexicographical Ranking of Institutions (Ranking Structure {A, B, C, D})

Ordering	# of Publications in Groups				Total publications	Faculty	Score Weighted by IF				Score Total	Per capita Score in Groups				Per capita Score Total
	A	B	C	D			A	B	C	D	A+B+C+D	A	B	C	D	
CERGE-EI	10	16	21	135	182	21	16.673	11.554	7.179	8.343	43.749	0.793952	0.55019	0.341857	0.397286	2.083286
UK FSV IES	3	4	9	140	156	22	3.753	2.683	3.249	10.472	20.157	0.170591	0.121955	0.147682	0.476	0.916227
VSE FM	1	2	1	4	8	35	1.178	1.712	0.282	0.284	3.456	0.033657	0.048914	0.008057	0.008114	0.098743
CZU FPE	1	1	2	10	14	111	1.028	0.809	0.622	1.121	3.58	0.009261	0.007288	0.005604	0.010099	0.032252
UHK FIM	0	1	0	12	13	13	0	0.69	0	0.236	0.926	0	0.053077	0	0.018154	0.071231
VSE FNH	0	2	2	48	52	38	0	1.492	0.586	8.511	10.589	0	0.039263	0.015421	0.223974	0.278658
VSE FIS	0	2	2	77	81	85	0	1.186	0.638	12.677	14.501	0	0.013953	0.007506	0.149141	0.1706
VSE FPH	0	1	0	24	25	86	0	0.568	0	2.994	3.562	0	0.006605	0	0.034814	0.041419
VSB EF	0	1	3	61	65	144	0	0.605	0.879	4.664	6.148	0	0.004201	0.006104	0.032389	0.042694
MU EF	0	0	2	11	13	26	0	0	0.746	1.523	2.269	0	0	0.028692	0.058577	0.087269
VSE FFU	0	0	4	75	79	78	0	0	1.474	11.897	13.371	0	0	0.018897	0.152526	0.171423
VSE FMV	0	0	2	61	63	78	0	0	0.842	7.478	8.32	0	0	0.010795	0.095872	0.106667
SUO OPF	0	0	1	5	6	42	0	0	0.293	0.236	0.529	0	0	0.006976	0.005619	0.012595
TUL HF	0	0	0	6	6	36	0	0	0	1.041	1.041	0	0	0	0.028917	0.028917
JCU FZ	0	0	0	4	4	29	0	0	0	0.594	0.594	0	0	0	0.020483	0.020483
MZU FPE	0	0	0	3	3	57	0	0	0	0.47	0.47	0	0	0	0.008246	0.008246
UJEP FSE	0	0	0	3	3	46	0	0	0	0.347	0.347	0	0	0	0.007543	0.007543
ZCU FE	0	0	0	1	1	65	0	0	0	0.062	0.062	0	0	0	0.000954	0.000954
UP FES	0	0	0	3	3	75	0	0	0	0	0	0	0	0	0	0
UTB FME	0	0	0	3	3	54	0	0	0	0	0	0	0	0	0	0
Others	5	12	61	377	455	89	5.589	8.152	19.037	47.074	79.852	0.062798	0.091596	0.213899	0.528921	0.897213
Total	20	42	110	1 063	1 235	1 230	28.221	29.451	35.827	120.024	213.523	0.022944	0.023944	0.029128	0.09758	0.173596