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**CROSS CORRELATION ANALYSIS BETWEEN SNIP, SJR AND IF FOR SELECTED JOURNALS**  
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### Annotation:

The cross correlation analysis was presented in the given article and linear regression equations between various types of journal metrics (SNIP, SJR, IF) were obtained for Economics and Mathematics and Computer Science journals. It was showed that correlation coefficients for all the journal metrics of the first group of journals (Economics journals) were higher than the similar coefficients in the second group of journals (Mathematics and Computer Science journals). It was obtained that the mean observation of the journal metrics for the first group of journals come up to the inequalities  $IF > SJR > SNIP$  with a small spread of the mean values, as for the second group of the journal metrics the following inequalities takes place:  $SNIP > IF > SJR$

**Key words:** cross correlation analysis, journal metrics, SNIP, SJR, IF, Economics Journal, Mathematics and Computer Science Journals.

### Introduction

As an alternative to the Journal Impact Factor (IF) developed by the Institute of Scientific Information (ISI) of Thomson-Renters (Sher, Garfield, 1965; Garfield, 1972), the SCImago Journal Rank (SJR) was developed in 2005 (Gonzalez-Pereire, Guerrero-Bote, Moya-Anegón, 2005), and in 2010 the Source Normalized Impact per Paper (SNIP) (Moed et al, 2010) was developed as well. In January 2010, Scopus endorsed last two journal metrics (Colledge et al, 2010). The first scientific articles were published in 2008, comparing SJR with IF (Falagas et al, 2008; Butler, 2008), and in 2010 the first scientific article was published, comparing SNIP with IF (Leydesdorff, Opthof, 2010). In the article (Falagas, 2008) the comparative ranking for the top 20 journals by IF and SJR was given and in the article (Butler, 2008) the similar comparison but for the top 10 journals was given as well.

In the last article, there is comparative analysis of SNIP, SJR and IF values for the four mathematical journals and one biological journal on 2007. Detailed analysis of SJR and SNIP advantages over IF was done in the work

Vladimir M. Moskovkin\*et al. /International Journal of Pharmacy & Technology (Lancho-Barrantes, Guerrero-Bote, Moya-Anegón, 2010). In terms of the correlation analysis between these journal metrics for a certain sample of journals, the conclusion in this article is important for us, which states that the range that SJR and SNIP cover (about 0 to 10) is smaller than the range of the IF ( about 0 to 60).

Also, we should emphasize the work (Ahlgren, Waltman, 2014), in which the degree to which the values of the above mentioned journal metrics correlate with the quality levels in the Norwegian model is analyzed.

In our work the correlation analysis will be conducted between SNIP, SJR and IF values for two aggregated subject areas of journals by Elsevier publishing House.

## **Methodology**

October 19, 2016 we chose four subject areas of journals on the Elsevier website, such as: 1. All journals within Economics and Finance; 2. All journals within Business, Management and Accounting; 3. All journals within Mathematics; 4.

All journals within Computer Science. We chose journals in each subject area of journals which had all data on SNIP, SJR and IF simultaneously, i.e. those journals which were included in the database of Scopus and Web of Science at the same time. Eventually in every subject area, there were 77; 51; 90 and 102 journals, consequently. After that, we have combined two first and two second subject areas due to their similarity in content, and we've got two aggregated subject areas (Table 1).

Under such aggregation, we have included the «Journal of Manufacturing Systems» additionally from the fourth subject area (All journals within Computer Science) to the first aggregated subject area; the journal «Computers & Industrial Engineering» from the first subject area to the second aggregated subject area, and the «Journal of Economic Dynamics and Control» and the «Review of Economic dynamics» from the first subject area to the second aggregated subject area.

As a result, we got 114 journals in the first aggregated subject area and 150 journals in the second aggregated subject area.

After that, we have done a correlation analysis between indicators of SNIP, SJR and IF, using the standard features of Excel, and also, we have calculated the mean values of these indicators by aggregated subject areas to compare them with literature data.

## **Results and Discussion**

Table 1 and Table 2 show the initial data of journal metrics for the first and the second aggregated subject areas.

**Table 1:** Data of journal metrics for the aggregated subject area «Journals within Economics, Finance Business, Management and Accounting». October 19, 2016.

| <b>Journals within Economics, Finance Business, Management and Accounting</b> | <b>SNIP</b> | <b>SJR</b> | <b>IF</b> | <b>Journals within Economics, Finance Business, Management and Accounting</b> | <b>SNIP</b> | <b>SJR</b> | <b>IF</b> |
|---|-------------|------------|-----------|---|-------------|------------|-----------|
| Accounting, Organizations & Society   | 2.813       | 2.515      | 2.464     | International Journal of Information Management                               | 2.495       | 1.173      | 2.692     |
| Applied Ergonomics  | 1.882       | 1.212      | 1.713     | International Journal of Industrial Organization                              | 0.980       | 1.085      | 0.866     |
| Business Horizons   | 1.671       | 0.726      | 1.008     | International Journal of Project Management                                   | 2.569       | 1.497      | 2.885     |
| China Economic Review   | 1.186       | 0.997      | 1.116     | International Journal of Research in Marketing                                | 1.573       | 3.004      | 1.833     |
| Communist and Post-Communist Studies  | 1.232       | 0.666      | 0.308     | International Review of Economics & Finance                                   | 1.362       | 0.890      | 1.846     |
| Computers & Industrial Engineering  | 1.846       | 1.630      | 2.086     | International Review of Law and Economics                                     | 0.978       | 0.369      | 0.543     |
| Computers in Industry   | 1.978       | 0.930      | 1.685     | Japan and the World Economy   | 1.066       | 0.477      | 0.603     |
| Decision Support Systems  | 2.271       | 2.262      | 2.604     | Journal of Accounting and Economics   | 3.507       | 6.834      | 3.535     |
| Ecological  | 1.512       | 1.733      | 3.227     | Journal of  | 1.478       | 1.030      | 1.317     |

|                                  |       |       |       |   |       |       |       |
|----------------------------------|-------|-------|-------|---|-------|-------|-------|
| Economics                        |       |       |       | Accounting and Public Policy                  |       |       |       |
| Economic Modelling               | 1.024 | 0.815 | 0.997 | Journal of Air Transport Management           | 1.103 | 0.845 | 1.084 |
| Economic Systems                 | 0.933 | 0.420 | 0.701 | Journal of Banking and Finance (JBF)          | 1.588 | 1.264 | 1.485 |
| Economics and Human Biology      | 0.942 | 1.272 | 1.639 | Journal of Business Research                  | 1.889 | 1.682 | 2.129 |
| Emerging Markets Review          | 1.641 | 0.879 | 1.549 | Journal of Business Venturing                 | 3.270 | 4.923 | 4.204 |
| Energy                           | 1.898 | 2.350 | 4.292 | Journal of Choice Modelling                   | 0.648 | 0.549 | 1.056 |
| Energy Economics                 | 1.851 | 3.025 | 2.862 | Journal of Comparative Economics              | 1.382 | 1.066 | 1.380 |
| Energy Policy                    | 1.653 | 2.436 | 3.045 | Journal of Consumer Psychology                | 1.669 | 2.973 | 2.009 |
| European Economic Review         | 1.405 | 1.712 | 1.095 | Journal of Corporate Finance                  | 1.356 | 1.446 | 1.286 |
| European Management Journal      | 1.382 | 0.816 | 1.437 | Journal of Destination Marketing & Management | 1.519 | 1.003 | 1.034 |
| Evaluation and Program Planning  | 0.914 | 0.470 | 1.000 | Journal of Development Economics              | 2.508 | 2.840 | 1.837 |
| Evolution and Human Behavior     | 1.395 | 1.942 | 3.223 | Journal of Econometrics                       | 2.002 | 3.781 | 1.611 |
| Explorations in Economic History | 1.540 | 1.306 | 1.000 | Journal of Economic Behavior and              | 1.362 | 1.425 | 1.374 |

|   |       |       |       | Organization                                      |       |       |       |
|---|-------|-------|-------|---|-------|-------|-------|
| Finance Research Letters                                | 0.663 | 0.405 | 0.480 | Journal of Economic Dynamics and Control          | 1.029 | 0.937 | 0.879 |
| Forest Policy and Economics                             | 1.207 | 1.195 | 1.552 | Journal of Economic Psychology                    | 1.496 | 1.085 | 1.677 |
| Futures   | 1.164 | 0.638 | 1.242 | Journal of Economic Theory                        | 1.489 | 2.587 | 1.097 |
| Games and Economic Behavior                             | 1.154 | 1.596 | 0.882 | Journal of Empirical Finance                      | 1.041 | 0.879 | 0.907 |
| Human Resource Management Review                        | 2.451 | 1.224 | 2.236 | Journal of Engineering and Technology Management  | 1.706 | 1.079 | 1.474 |
| Industrial Marketing Management                         | 1.385 | 1.413 | 1.930 | Journal of Environmental Economics and Management | 1.795 | 2.915 | 2.197 |
| Information and Management                              | 1.919 | 1.381 | 2.163 | Journal of Family Business Strategy               | 0.743 | 0.980 | 1.088 |
| Information and Organization                            | 1.640 | 1.306 | 1.419 | Journal of Financial Economics                    | 4.028 | 9.920 | 3.541 |
| Information Economics and Policy                        | 1.513 | 0.947 | 0.826 | Journal of Financial Intermediation               | 1.734 | 1.861 | 2.145 |
| International Business Review                           | 1.441 | 1.100 | 1.669 | Journal of Financial Markets                      | 1.644 | 3.233 | 1.726 |
| International Journal of Accounting Information Systems | 1.669 | 0.657 | 1.128 | Journal of Financial Stability                    | 1.791 | 1.264 | 1.689 |
| International   | 1.777 | 1.198 | 1.626 | Journal of Forest                                 | 0.992 | 0.746 | 1.185 |

|  |       |       |       |                                       |       |       |       |
|--|-------|-------|-------|---------------------------------------|-------|-------|-------|
| Journal of Forecasting   |       |       |       | Economics                             |       |       |       |
| International Journal of Hospitality Management                      | 1.779 | 1.887 | 2.061 | Journal of Health Economics           | 2.258 | 2.292 | 2.339 |
| Journal of Hospitality, Leisure, Sport & Tourism Education - JoHLSTE | 0.668 | 0.353 | 0.375 | Long Range Planning                   | 2.481 | 1.958 | 2.936 |
| Journal of Housing Economics   | 1.101 | 0.883 | 1.035 | Management Accounting Research        | 2.715 | 1.913 | 2.286 |
| Journal of International Economics                                   | 2.635 | 3.723 | 2.017 | Omega                                 | 2.846 | 3.771 | 3.962 |
| Journal of International Financial Markets, Institutions & Money     | 1.266 | 0.872 | 1.051 | Organizational Dynamics               | 0.456 | 0.670 | 0.522 |
| Journal of International Management                                  | 1.427 | 1.829 | 1.982 | Pacific-Basin Finance Journal         | 0.962 | 0.541 | 0.938 |
| Journal of International Money and Finance                           | 1.624 | 1.316 | 1.524 | Regional Science and Urban Economics  | 1.335 | 1.328 | 1.024 |
| Journal of Interactive Marketing                                     | 2.755 | 3.077 | 3.256 | Research in Organizational Behavior   | 1.459 | 1.806 | 1.889 |
| Journal of Macroeconomics  | 0.936 | 0.618 | 0.714 | Research in Social Stratification and | 1.193 | 1.126 | 1.379 |

|   |       |       |       | Mobility                                     |       |       |       |
|---|-------|-------|-------|--|-------|-------|-------|
| Journal of Manufacturing Systems                    | 2.248 | 1.190 | 2.240 | Research Policy                              | 3.126 | 3.536 | 3.470 |
| Journal of Mathematical Economics                   | 0.605 | 0.579 | 0.434 | Resource and Energy Economics                | 1.145 | 1.159 | 1.250 |
| Journal of Monetary Economics                       | 2.216 | 4.150 | 2.488 | Resources Policy                             | 1.560 | 1.083 | 2.489 |
| Journal of Nutrition Education and Behavior (JNEB)  | 1.060 | 1.060 | 2.253 | Review of Economic Dynamics                  | 1.574 | 2.554 | 1.256 |
| Journal of Operations Management                    | 3.290 | 5.052 | 4.000 | Scandinavian Journal of Management           | 1.001 | 0.504 | 1.076 |
| Journal of Policy Modeling                          | 1.068 | 0.935 | 0.986 | Sport Management Review                      | 1.561 | 0.805 | 1.193 |
| Journal of Public Economics                         | 1.707 | 2.267 | 1.440 | Technological Forecasting and Social Change  | 1.752 | 1.348 | 2.678 |
| Journal of Purchasing & Supply Management           | 1.661 | 2.359 | 2.562 | Technovation                                 | 2.169 | 1.794 | 2.243 |
| Journal of Retailing                                | 2.180 | 2.056 | 2.014 | Telecommunications Policy                    | 1.004 | 0.658 | 0.982 |
| Journal of Stored Products Research                 | 1.069 | 0.786 | 1.533 | The Journal of Strategic Information Systems | 1.693 | 1.605 | 2.595 |
| Journal of the Japanese and International Economies | 0.809 | 0.409 | 0.508 | The Leadership Quarterly                     | 2.122 | 2.770 | 2.938 |

|                                |       |       |       |   |       |       |       |
|--------------------------------|-------|-------|-------|---|-------|-------|-------|
| Journal of Urban Economics     | 2.225 | 2.434 | 2.121 | The North-American Journal of Economics and Finance | 0.785 | 0.578 | 1.360 |
| Journal of Vocational Behavior | 1.935 | 1.741 | 2.764 | Tourism Management                                  | 2.876 | 2.450 | 3.140 |
| Journal of World Business      | 1.899 | 1.656 | 2.811 | Utilities Policy                                    | 0.972 | 0.547 | 1.110 |
| Labour Economics               | 1.229 | 1.127 | 0.899 | World Development                                   | 2.157 | 2.100 | 2.438 |

**Table 2:** Data of journal metrics for the aggregated subject area «Journals within Mathematics and Computer Science». October 19, 2016

| Journals within Mathematics and Computer Science | SNIP  | SJR   | IF    | Journals within Mathematics and Computer Science | SNIP  | SJR   | IF    |
|--|-------|-------|-------|--|-------|-------|-------|
| Acta Mathematica Scientia                        | 0.727 | 0.615 | 0.557 | Computers & Industrial Engineering               | 1.846 | 1.630 | 2.086 |
| Ad Hoc Networks                                  | 2.144 | 0.967 | 1.660 | Computers & Fluids                               | 1.585 | 1.171 | 1.891 |
| Advances in Applied Mathematics                  | 1.249 | 1.054 | 0.833 | Computers & Graphics                             | 1.299 | 0.514 | 1.120 |
| Advances in Engineering Software                 | 1.874 | 0.812 | 1.673 | Computers & Mathematics with Applications        | 1.357 | 1.092 | 1.398 |
| Advances in Mathematics                          | 1.995 | 3.261 | 1.405 | Computers & Security                             | 2.563 | 1.020 | 1.640 |
| Annals of Pure and Applied Logic                 | 1.335 | 1.190 | 0.582 | Computers & Structures                           | 2.136 | 1.710 | 2.425 |
| Annual Reviews in Control                        | 4.985 | 2.443 | 2.042 | Computers and Electronics in Agriculture         | 1.786 | 0.823 | 1.892 |



|   |       |       |       |  |       |       |       |
|---|-------|-------|-------|--|-------|-------|-------|
| Applied and Computational Harmonic Analysis | 1.776 | 1.589 | 2.094 | Computers in Biology and Medicine          | 1.207 | 0.589 | 1.521 |
| Applied Mathematical Modelling              | 1.612 | 1.318 | 2.291 | Computers in Industry                      | 1.978 | 0.930 | 1.685 |
| Applied Mathematics and Computation         | 1.203 | 1.008 | 1.345 | Control Engineering Practice               | 2.048 | 1.354 | 1.830 |
| Applied Mathematics Letters                 | 1.235 | 1.141 | 1.659 | Cortex                                     | 1.417 | 2.469 | 4.314 |
| Applied Numerical Mathematics               | 1.266 | 1.254 | 1.414 | Data & Knowledge Engineering               | 2.412 | 1.258 | 1.500 |
| Applied Soft Computing                      | 2.143 | 1.763 | 2.857 | Decision Support Systems                   | 2.271 | 2.262 | 2.604 |
| Artificial Intelligence                     | 4.084 | 2.426 | 3.333 | Design Studies                             | 3.091 | 1.056 | 2.070 |
| Artificial Intelligence in Medicine         | 1.721 | 0.884 | 2.142 | Differential Geometry and its Applications | 0.929 | 0.641 | 0.594 |
| Automatica                                  | 2.991 | 4.315 | 3.635 | Digital Investigation                      | 1.766 | 0.674 | 1.211 |
| Bulletin des Sciences Mathématiques         | 1.246 | 1.942 | 0.664 | Digital Signal Processing                  | 1.331 | 0.688 | 1.444 |
| Chaos, Solitons & Fractals                  | 1.090 | 0.679 | 1.611 | Discrete Applied Mathematics               | 1.185 | 0.880 | 0.722 |
| Cognition                                   | 1.676 | 2.770 | 3.411 | Discrete Mathematics                       | 1.040 | 1.000 | 0.600 |
| Cognitive Systems Research                  | 1.850 | 0.307 | 1.204 | Discrete Optimization                      | 1.248 | 0.924 | 0.889 |

|  |       |       |       |  |       |       |       |
|--|-------|-------|-------|--|-------|-------|-------|
| Communications<br>in Nonlinear<br>Science and<br>Numerical<br>Simulation | 1.776 | 1.575 | 2.834 | Displays   | 1.419 | 0.481 | 1.903 |
| Comptes Rendus<br>Mathematique   | 0.775 | 1.154 | 0.446 | Ecological<br>Complexity                                     | 1.026 | 0.930 | 1.797 |
| Computational<br>Geometry  | 1.349 | 0.766 | 0.589 | Electronic<br>Commerce<br>Research and<br>Applications       | 2.053 | 1.582 | 2.139 |
| Computational<br>Statistics & Data<br>Analysis                           | 1.244 | 1.283 | 1.179 | Engineering<br>Analysis with<br>Boundary<br>Elements         | 1.320 | 1.251 | 1.862 |
| Computer Aided<br>Geometric<br>Design                                    | 1.554 | 1.024 | 1.092 | Engineering<br>Applications of<br>Artificial<br>Intelligence | 2.148 | 1.371 | 2.368 |
| Computer<br>Communications   | 2.002 | 0.889 | 2.099 | European Journal<br>of Combinatorics                         | 1.089 | 1.233 | 0.650 |
| Computer<br>Languages,<br>Systems and<br>Structures                      | 0.944 | 0.252 | 0.556 | European Journal<br>of Operational<br>Research               | 2.295 | 2.595 | 2.679 |
| Computer<br>Methods in<br>Applied<br>Mechanics and<br>Engineering        | 2.023 | 2.952 | 3.467 | Expert Systems<br>with Applications                          | 2.561 | 1.839 | 2.981 |
| Computer<br>Networks   | 1.819 | 0.755 | 1.446 | Expositiones<br>Mathematicae                                 | 0.628 | 0.453 | 0.784 |
| Computer Speech<br>and Language  | 1.648 | 0.974 | 1.324 | Finite Elements in<br>Analysis and<br>Design                 | 1.516 | 1.278 | 2.175 |
| Computer<br>Standards &  | 1.907 | 0.888 | 1.268 | Finite Fields and<br>Their                                   | 1.344 | 1.096 | 1.292 |

| Interfaces                                |       |       |       | Applications                                  |       |       |       |
|---|-------|-------|-------|---|-------|-------|-------|
| Computer Vision and Image Understanding   | 2.340 | 1.490 | 2.134 | Future Generation Computer Systems            | 3.323 | 1.483 | 2.430 |
| Computer-Aided Design                     | 2.183 | 1.078 | 2.149 | Fuzzy Sets and Systems                        | 1.712 | 1.711 | 2.098 |
| Computerized Medical Imaging and Graphics | 1.311 | 0.630 | 1.385 | Games and Economic Behavior                   | 1.154 | 1.596 | 0.882 |
| Computers & Electrical Engineering        | 1.164 | 0.565 | 1.084 | Graphical Models                              | 0.972 | 0.443 | 0.821 |
| Historia Mathematica                      | 0.597 | 0.233 | 0.464 | Journal of Process Control                    | 1.929 | 1.440 | 2.216 |
| Image and Vision Computing                | 2.049 | 1.700 | 1.766 | Journal of Pure and Applied Algebra           | 1.188 | 0.990 | 0.669 |
| Information and Computation               | 1.354 | 0.698 | 0.873 | Journal of Statistical Planning and Inference | 0.987 | 1.090 | 0.727 |
| Information and Management                | 1.919 | 1.381 | 2.163 | Journal of Symbolic Computation               | 1.843 | 0.979 | 1.030 |
| Information and Software Technology       | 3.163 | 0.920 | 1.569 | Journal of Systems and Software               | 2.415 | 0.897 | 1.424 |
| Information Fusion                        | 3.537 | 1.941 | 4.353 | Journal of Systems Architecture               | 1.084 | 0.399 | 0.683 |
| Information Processing Letters            | 1.265 | 0.698 | 0.605 | Journal of The Franklin Institute             | 1.411 | 1.454 | 2.327 |
| Information Sciences                      | 2.489 | 2.513 | 3.364 | Journal of the Korean Statistical Society     | 0.756 | 0.392 | 0.353 |

|   |       |       |       |  |       |       |       |
|---|-------|-------|-------|--|-------|-------|-------|
| Indagationes Mathematicae                                   | 0.861 | 0.476 | 0.407 | Journal of Visual Communication and Image Representation | 1.588 | 0.785 | 1.530 |
| Integration, the VLSI Journal                               | 1.156 | 0.283 | 0.703 | Journal of Visual Languages and Computing                | 1.398 | 0.411 | 0.634 |
| International Journal of Approximate Reasoning              | 2.091 | 2.304 | 2.696 | Journal of Web Semantics                                 | 6.086 | 2.435 | 1.277 |
| International Journal of Critical Infrastructure Protection | 1.826 | 0.655 | 1.351 | Knowledge-Based Systems                                  | 2.645 | 2.140 | 3.325 |
| International Journal of Forecasting                        | 1.777 | 1.198 | 1.626 | Linear Algebra and its Applications                      | 1.195 | 0.837 | 0.965 |
| International Journal of Human-Computer Studies             | 2.158 | 0.815 | 1.476 | Mathematical Biosciences                                 | 0.901 | 0.719 | 1.256 |
| International Journal of Non-Linear Mechanics               | 1.400 | 1.211 | 1.920 | Mathematical Social Sciences                             | 0.567 | 0.493 | 0.344 |
| Journal de Mathématiques Pures et Appliquées                | 1.746 | 3.180 | 1.818 | Mathematics and Computers in Simulation                  | 1.054 | 0.677 | 1.124 |
| Journal of Algebra  | 1.230 | 1.165 | 0.660 | Medical Image Analysis                                   | 3.083 | 2.048 | 4.565 |
| Journal of Applied Mathematics and Mechanics                | 0.710 | 0.310 | 0.367 | Neural Networks  | 2.236 | 1.629 | 3.216 |

|  |       |       |       |   |       |       |       |
|--|-------|-------|-------|---|-------|-------|-------|
| Journal of Approximation Theory                  | 1.265 | 0.923 | 0.921 | Neurocomputing                              | 1.757 | 1.202 | 2.392 |
| Journal of Combinatorial Theory, Series A        | 1.634 | 2.350 | 0.979 | Nonlinear Analysis: Hybrid Systems          | 1.520 | 1.994 | 3.192 |
| Journal of Combinatorial Theory, Series B        | 2.054 | 2.411 | 1.094 | Nonlinear Analysis: Real World Applications | 1.784 | 1.792 | 2.238 |
| Journal of Complexity                            | 1.653 | 1.226 | 1.358 | Ocean Modelling                             | 1.558 | 2.141 | 3.337 |
| Journal of Computational and Applied Mathematics | 1.293 | 1.089 | 1.328 | Operations Research Letters                 | 0.744 | 0.727 | 0.627 |
| Journal of Computational Science                 | 1.161 | 0.587 | 1.078 | Optical Switching and Networking            | 0.707 | 0.492 | 1.137 |
| Journal of Computer and System Sciences          | 2.376 | 1.334 | 1.583 | Parallel Computing                          | 1.693 | 0.726 | 1.000 |
| Journal of Differential Equations                | 1.876 | 2.809 | 1.821 | Pattern Recognition                         | 3.166 | 2.051 | 3.399 |
| Journal of Econometrics                          | 2.002 | 3.781 | 1.611 | Pattern Recognition Letters                 | 2.155 | 1.225 | 1.586 |
| Journal of Economic Dynamics and Control         | 1.029 | 0.937 | 0.879 | Performance Evaluation                      | 1.581 | 0.527 | 0.944 |
| Journal of Functional Analysis                   | 1.518 | 2.526 | 1.273 | Pervasive and Mobile Computing              | 2.051 | 0.872 | 1.719 |
| Journal of                                       | 1.111 | 0.705 | 0.752 | Review of                                   | 1.574 | 2.554 | 1.256 |

|   |       |       |       |  |       |       |       |
|---|-------|-------|-------|--|-------|-------|-------|
| Geometry and Physics                              |       |       |       | Economic Dynamics                        |       |       |       |
| Journal of Manufacturing Systems                  | 2.248 | 1.190 | 2.240 | Robotics and Autonomous Systems          | 2.265 | 1.377 | 1.618 |
| Journal of Mathematical Analysis and Applications | 1.262 | 1.161 | 1.014 | Science of Computer Programming          | 1.380 | 0.570 | 0.828 |
| Journal of Mathematical Economics                 | 0.605 | 0.579 | 0.434 | Signal Processing                        | 1.931 | 1.119 | 2.063 |
| Journal of Multivariate Analysis                  | 1.165 | 1.458 | 0.857 | Signal Processing: Image Communication   | 1.551 | 0.661 | 1.602 |
| Journal of Network and Computer Applications      | 2.762 | 1.100 | 2.331 | Statistics & Probability Letters         | 0.834 | 0.720 | 0.506 |
| Journal of Number Theory                          | 1.073 | 0.858 | 0.596 | Simulation Modelling Practice and Theory | 1.591 | 0.724 | 1.482 |
| Journal of Parallel and Distributed Computing     | 1.727 | 0.851 | 1.320 | Spatial Statistics                       | 1.785 | 1.052 | 1.385 |
| Journal of Pragmatics                             | 1.387 | 1.153 | 1.118 | Speech Communication                     | 1.677 | 0.685 | 1.038 |
| Stochastic Processes and their Applications       | 1.347 | 1.664 | 1.193 | Theoretical Computer Science             | 1.345 | 0.720 | 0.643 |
| Telematics and Informatics                        | 1.665 | 0.737 | 2.261 | Topology and its Applications            | 0.954 | 0.542 | 0.493 |

According these tables, we calculated the mean values of journal’s metrics for both aggregated subject areas (Table 3).

**Table 3:** The mean values of journal metrics for both aggregated subject areas. October 19, 2016.

| Aggregated subject area  | SNIP  | SJR   | IF    |
|--|-------|-------|-------|
| Journals within Economics, Finance Business, Management and Accounting (114) | 1.643 | 1.685 | 1.781 |
| Journals within Mathematics and Computer Science (150)                       | 1.699 | 1.250 | 1.588 |

This Table illustrates that there is an inequality  $IF > SJR > SNIP$  with a little scatter of their mean values for journals of first aggregated subject area. But there is another system of inequalities  $SNIP > IF > SJR$  for journals of second aggregated subject area. For comparison, we present the same data on a wider journal's sample from the work (Colledge et al, 2010) (Table 4).

**Table 4:** Mean values of various journal metrics for both main subject areas. April 2010

| Main subject fields                  | SNIP | SJR   | RIP  |
|--------------------------------------|------|-------|------|
| Social Science (4,256)               | 0.84 | 0.045 | 0.74 |
| Engineering Computer Science (2,175) | 1.3  | 0.070 | 1.08 |

In the Table 4 there is RIP (Raw Impact per paper), which is very similar to the IF (Colledge et al, 2010). This Table shows that there are inequalities  $SNIP > RIP > SJR$  in both cases. According to the Tables 3 and 4, the systems of inequalities are identical for similar aggregated subject areas, which include Computer Science.

Also, we can see that the mean values of journal metrics for similar aggregated subject areas have increased significantly with time (for 6 years).

Also, we can give an example of specific SNIP, SJR and IF values for the four mathematical journals in the work (Leydesdorff, Opthof, 2010) on 2007 (Table 5).

**Table 5:** Various journal metrics values for the four mathematical journals. 2007.

| Journal          | SNIP  | SJR   | IF    |
|------------------|-------|-------|-------|
| Invent Math      | 3.294 | 0.065 | 1.664 |
| J Electron Mater | 1.319 | 0.113 | 1.320 |
| Math Res Lett    | 1.179 | 0.041 | 0.702 |

|          |       |       |       |
|----------|-------|-------|-------|
| Ann Math | 4.979 | 0.104 | 2.739 |
|----------|-------|-------|-------|

Table 5 shows that values of journal metrics are included in comparative series SNIP>IF>SJR of Mathematical and Computer journal’s mean values (Table 3,4).

By comparison of SJR with IF in the work (Falagas et al, 2008), the authors have found out that of the 20 journals with the highest journal IFs, 13 retain a position in the top 20 journals with the use of the SJR indicator, and vice versa.t the same time, as it was mentioned in the introduction, we have not found the works in which the direct correlations between SNIP, SJR and IF have been obtained.

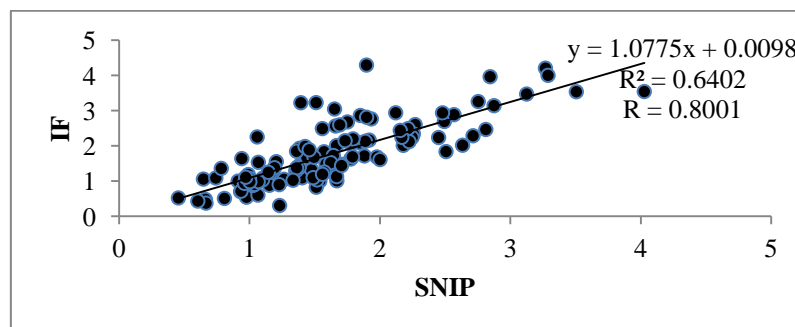
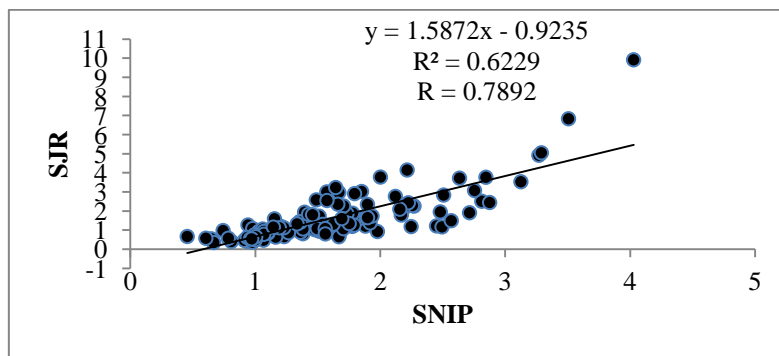
Table 6 shows a matrix of paired correlations of journal's metrics values for both aggregated subject areas, which have been obtained on the basis of the Tables 1 and 2.

**Table 6:** Matrix of paired correlations (R) of various journal's metrics values for both aggregated subject areas.

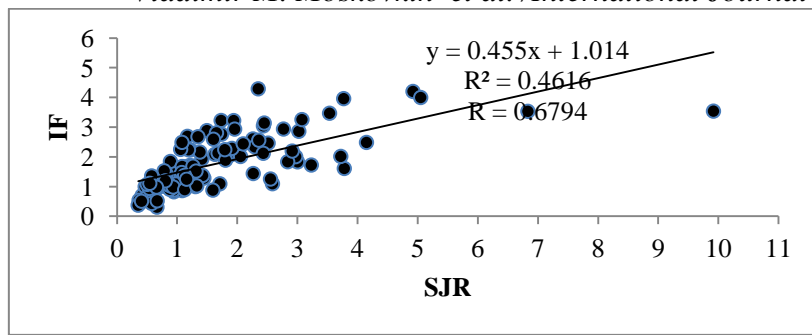
|      | Journals within Economics, Finance Business, Management and Accounting (114) |        |    | Journals within Mathematics and Computer Science (150) |        |    |
|------|--|--------|----|--|--------|----|
|      | SNIP   | SJR    | IF | SNIP   | SJR    | IF |
| SNIP | 1  |        |    | 1  |        |    |
| SJR  | 0.7892   | 1      |    | 0.5069   | 1      |    |
| IF   | 0.8001   | 0.6794 | 1  | 0.5780   | 0.6749 | 1  |

As we can see, this table shows that Pearson's correlation coefficients for all journal metrics of Economics aggregated subject area are higher than similar correlation coefficients for Mathematics and Computer aggregated subject area.

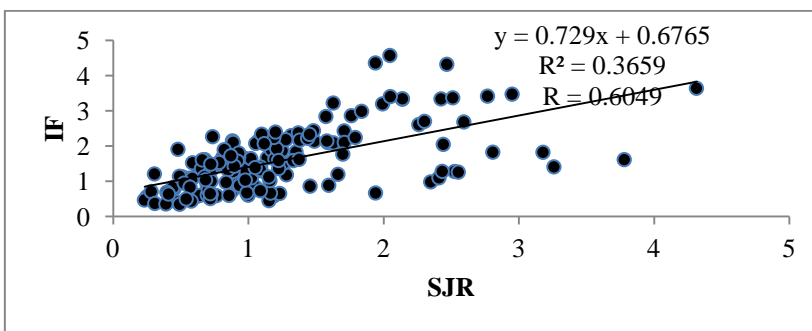
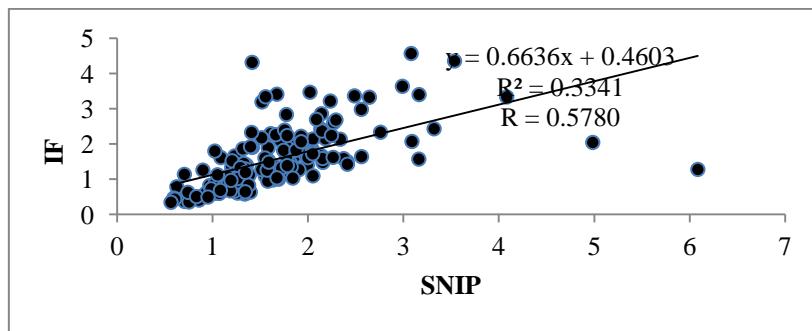
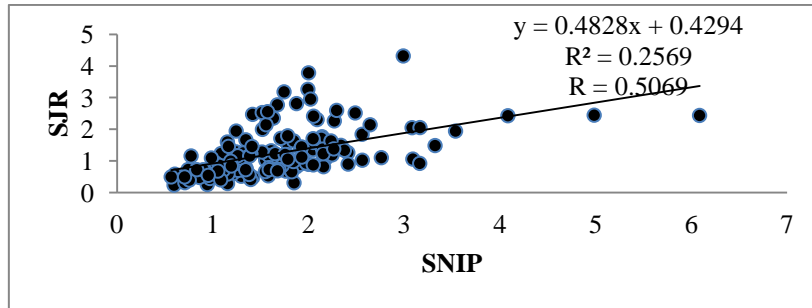
The corresponding linear regression equations are illustrated in Figures 1 and 2.







**Figure 1.** Linear regression equations between various journal metrics for the aggregated subject area «Journals within Economics, Finance Business, Management and Accounting»



**Figure 2.** Linear regression equations between various journal metrics for the aggregated subject area «Journals within Mathematics and Computer Science»

**Conclusion:** In this piece of research work there is a matrix of paired correlations and linear regression equations between various types of journal metrics (SNIP, SJR, IF) in this work, which are based on two aggregated subject areas, which have been obtained by the Elsevier database (October 19, 2016). It is shown that Pearson's correlation coefficients for all journal metrics of Economics aggregated subject area were higher than similar correlation coefficients for Mathematics and Computer aggregated subject area. Additionally, the mean values of the above

mentioned journal metrics for aggregated subject areas under consideration were calculated, which were compared with the literature data. The main conclusion of this work suggests that there is an inequalities  $IF > SJR > SNIP$  with a little scatter of mean values for journals of Economics aggregated subject area, and  $SNIP > IF > SJR$  - for journals of Mathematics and Computer aggregated subject area.

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