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CORRELATION ANALYSIS BETWEEN JOURNAL METRICS AND SUBSCRIPTION PRICE FOR SELECTED JOURNALS

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Abstract

The given article gives an account on the correlation analysis between the journal metrics (SNIP, SJR, IF) and the subscription price for two groups of journals (114 Economics journals and 150 Mathematics and Computer Science journals) which were presented on Elsevier website in October 2016.

It was obtained that the correlation coefficients of the given journal metrics for the second group of journals were considerably lower in comparison with the first group of journals. It is due to the fact that the sales of Mathematics and Computer Science journals are less commercialized as compared to the sales of Economics journals. It was concluded that the lack of strong correlation between journal metrics and subscription price at the market of scientific periodicals is generally due to the fact that this kind of market is not elastic and over monopolized.

Key words: correlation analysis, journal metrics, SNIP, SJR, IF, subscription price, Economics Journal, Mathematics and Computer Science journals.

Introduction.

As E. Garfield (1972) puts it the primary goal of impact factor analysis was to improve the management of library journal collection. This is especially true to making budget decision making for the purchase of the most cost effective journals. An example of such a study is the work of Hue-Kyung Chung (2007). This study presents a method for journal collection evaluation using citation analysis, in which cost-per-use (CPU) for each title is used to measure cost effectiveness with higher CPU scores indicating cost effective titles. In this research the data are based on the impact factor and locally collected citation score of each title and is compared to the cost of managing and subscribing to journals.

Given methodology was developed by the same author in the research work (Chung, 2009). In it the analysis model for setting up a core journal collection for academic libraries is presented. The model uses multiple factors based on

the concept that convergence of data from all available sources should be used in core journal selection due to the inherent limitations of each source. The factors considered in the study are locally collected citations, local use, impact factor and subscription price.

There is a range of studies which study the correlation between citation-based and expert-based assessments of journals. S.Saha, S.Saint, and D.A. Christakis (2003) assessed the validity of impact factor as a measure of quality for nine general medical journals by testing its association with journal quality as rated by clinical practitioners (n=113) and researchers (n=151). The correlation between impact factor and physicians' ratings of journal quality was strong (R^2 =0, 82). The authors emphasize that apart of the impact factor subscription rates and readership rates are other potential proxies for journal quality, but these markers are limited by the fact that, for many journals, subscription is not related to physicians' desire to read the journals but rather to society membership, as well as to journal cost and availability.

In the other research work (Ahlgren, Waltman,2014) the Source Normalized Impact per Paper (SNIP), the Scimago Journal Rank 2 (SJR2) and the Raw Impact for Paper (RIP) indicators are used to assess sources based on their citations, while the Norwegian model is used to obtain expert-based source assessments.

It was found out that the sources at higher quality levels on average have substantially higher RIP, SNIP, and SJR2 values.

Thus, now there is the dominant view that the impact factor of the journal defines its quality though there are many studies that cast doubt on this claim (Seglen, 1997; Kurmis, 2003; Dong Loh, Mondry, 2005). So Per O Seglen (1997) writes that the journal impact factor would still be far from being a quality indicator: citation impact is primary a measure of scientific utility rather than of scientific quality and that for evaluation of scientific quality there seems to be no alternative to qualified experts reading the publications. In the other study (Kurmis, 2003) it is denoted that the extension of the impact factor to the assessment of journal quality or individual authors is inappropriate. In the study (Dong, Loh, Mondry, 2005) it is plainly stated: "It is generally understood that the higher the IF, the "better" the journal. As a result, journals with high If are often preferentially acquired in institutions where subscription funds are limited; researchers are keen to submit their work to journals with high IF to further their career; the editors of journals with high IF are swamped with manuscripts by researchers who want to publish only with the best, some funding agencies expect their scientists to publish in journals above a certain IF; and recruitment officers tend to look for candidates with publications in high-IF journals."

Nevertheless if we have an opinion that journal impact factor determines the quality of journals, then according to competitive market economic theory we can say that the bigger impact factor of the journal the higher is its subscription price. But it is evident that this statement was not respected up to the start of the 21st century because of there were a great deal of non profit publishers. Indeed in the study (Hartemink, 1999) it was mentioned that some recent correspondence to Nature suggested that journal prices and impact factors are inversely related (Abbort, 1999; Butler, 1999). It was found that the most expensive chemical/ medical journals had lowest impact factors. The analysis of 17 soil science journals conducted for connection against impact factor and prices for 1997 lead to the same functional reliance (Hartemink, 1999). It was due to the fact that 6 out of 17 soil science journals were published by non profit publishers and that is why they have low subscription price at relatively high impact factor value.

In addition to the above mentioned studies we denote the work (Bergstrom,Bergstrom, 2006), in which we can see the distribution of top ten journals in ecology, ranked by 2004 IF in dependence of the subscription price/page index.

In the 21st century the majority of non profit publishers pass in to the hands of commercial publishers and the situation on the market of scientific periodicals started to change greatly. Unfortunately we haven't found the studies in which the correlation between journal impact factors and subscription price was studied using large samples. In this study we tried to fill a want in it.

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 areas, 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.

Data of the journal subscription price was taken from Journal's websites on May 19, 2015 and October 19, 2016 that allowed to calculate the price growth of the journal subscription of their two aggregated subject areas over a longer than year's period of time.

Results and Discussion

Table 1 and Table 2 show the data of journal metrics for the first and the second aggregated subject areas of journals, and Table 3 and Table 4 show subscription prices for these journals.

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

Journals within Economics, Finance Business, Management and Accounting	**SNIP**	**SJR**	**IF**	**Journals within Economics, Finance Business, Management and Accounting**	**SNIP**	**SJR**	**IF**
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	1.573	3.004	1.833

				Marketing			
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 Economics	1.512	1.733	3.227	Journal of Accounting and Public Policy	1.478	1.030	1.317
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	1.405	1.712	1.095	Journal of	1.356	1.446	1.286

Economic Review				Corporate Finance			
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 Organization	1.362	1.425	1.374
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 Journal of Forecasting	1.777	1.198	1.626	Journal of Forest Economics	0.992	0.746	1.185
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 &	1.266	0.872	1.051	Organizational Dynamics	0.456	0.670	0.522

Money							
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 Mobility	1.193	1.126	1.379
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 in Nonlinear Science and Numerical Simulation	1.776	1.575	2.834	Displays	1.419	0.481	1.903
Comptes Rendus Mathematique	0.775	1.154	0.446	Ecological Complexity	1.026	0.930	1.797
Computational Geometry	1.349	0.766	0.589	Electronic Commerce Research and Applications	2.053	1.582	2.139
Computational Statistics & Data Analysis	1.244	1.283	1.179	Engineering Analysis with Boundary Elements	1.320	1.251	1.862
Computer Aided Geometric Design	1.554	1.024	1.092	Engineering Applications of Artificial Intelligence	2.148	1.371	2.368
Computer Communications	2.002	0.889	2.099	European Journal of Combinatorics	1.089	1.233	0.650
Computer Languages, Systems and Structures	0.944	0.252	0.556	European Journal of Operational Research	2.295	2.595	2.679

Computer Methods in Applied Mechanics and Engineering	2.023	2.952	3.467	Expert Systems with Applications	2.561	1.839	2.981
Computer Networks	1.819	0.755	1.446	Expositiones Mathematicae	0.628	0.453	0.784
Computer Speech and Language	1.648	0.974	1.324	Finite Elements in Analysis and Design	1.516	1.278	2.175
Computer Standards & Interfaces	1.907	0.888	1.268	Finite Fields and Their Applications	1.344	1.096	1.292
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	3.163	0.920	1.569	Journal of Systems and	2.415	0.897	1.424

Technology				Software			
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	2.051	0.872	1.719

				Computing			
Journal of Geometry and Physics	1.111	0.705	0.752	Review of Economic Dynamics	1.574	2.554	1.256
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

Table 3: Journal's subscription prices for the aggregated subject area «Journals within Economics, Finance Business, Management and Accounting»

Journals within Economics, Finance Business, Management and Accounting	**Price USA-USD May 19, 2015**	**Price USA-USD October 19, 2016**	**Growth, %**	**Journals within Economics, Finance Business, Management and Accounting**	**Price USA-USD May 19, 2015**	**Price USA-USD October 19, 2016**	**Growth, %**
Accounting, Organizations & Society	2928	3362	14.8	Information and Management	1385	1646	18.8
Applied Ergonomics	1745	1987	13.9	Information and Organization	1100	1278	16,2
Business Horizons	552	615	11.4	Information Economics and Policy	881	989	12.3
China Economic Review	695	827	19	International Business Review	1835	2152	17.3
Communist and Post-Communist Studies	690	747	8.3	International Journal of Accounting Information Systems	674	774	14.8
Computers & Industrial Engineering	4410	5077	15.1	International Journal of Forecasting	996	1059	6.3
Computers in Industry	2012	2349	16.7	International Journal of Hospitality Management	1308	1570	20
Decision Support Systems	1920	2284	19	International Journal of Industrial Organization	2139	2353	10
Ecological Economics	2851	3391	18.9	International Journal of Information Management	1375	1628	18.4
Economic			18.4	International			16

Modelling	1560	1847		Journal of Project Management	1886	2187	
Economic Systems	522	565	8.2	International Journal of Research in Marketing	1079	1277	18.4
Economics and Human Biology	690	810	17.4	International Review of Economics & Finance	678	803	18.4
Emerging Markets Review	406	481	18.5	International Review of Law and Economics	942	1090	15.7
Energy	4133	4937	19,5	Japan and the World Economy	875	1002	14.5
Energy Economics	1739	2059	18.4	Journal of Accounting and Economics	2100	2434	15.9
Energy Policy	3736	4392	17.6	Journal of Accounting and Public Policy	1077	1237	14.9
European Economic Review	2313	2713	17.3	Journal of Air Transport Management	1155	1354	17.2
European Management Journal	1235	1362	10.3	Journal of Banking and Finance (JBF)	4466	4857	8.8
Evaluation and Program Planning	1381	1619	17.2	Journal of Business Research	3248	3764	15.9
Evolution and Human Behavior	1786	2032	13.8	Journal of Business Venturing	1604	1907	18.9
Explorations in Economic History	815	927	13.7	Journal of Choice Modelling	333	373	12

Finance Research Letters	689	797	15.7	Journal of Comparative Economics	915	1023	11.8
Forest Policy and Economics	753	893	18.6	Journal of Consumer Psychology	982	1104	12.4
Futures	1747	2030	16.2	Journal of Corporate Finance	873	1048	20
Games and Economic Behavior	1284	1506	17.3	Journal of Destination Marketing & Management	507	570	12.4
Human Resource Management Review	797	957	20.1	Journal of Development Economics	3020	3452	14.3
Industrial Marketing Management	1751	2029	15.9	Journal of Operations Management	1027	1170	13.9
Journal of Econometrics	4415	5001	13.3	Journal of Policy Modeling	1191	1291	8.4
Journal of Economic Behavior and Organization	3676	4183	13.8	Journal of Public Economics	3669	4283	16.7
Journal of Economic Dynamics and Control	2682	3103	15.7	Journal of Purchasing & Supply Management	830	977	17.7
Journal of Economic Psychology	1064	1254	17.9	Journal of Retailing	623	701	12.5
Journal of Economic Theory	4087	4434	8.5	Journal of Stored Products Research	1902	2179	14.6
Journal of Empirical Finance	891	1050	17.8	Journal of the Japanese and	846	978	15.6

				International Economies			
Journal of Engineering and Technology Management	730	856	17.3	Journal of Urban Economics	1776	2030	14.3
Journal of Environmental Economics and Management	1619	1850	14.3	Journal of Vocational Behavior	1644	1946	18.4
Journal of Family Business Strategy	592	684	15.5	Journal of World Business	705	846	20
Journal of Financial Economics	3909	4669	19.4	Labour Economics	900	1061	17.9
Journal of Financial Intermediation	689	815	18.3	Long Range Planning	2428	2763	13.8
Journal of Financial Markets	616	730	18,5	Management Accounting Research	709	826	16.5
Journal of Financial Stability	443	530	19.6	Omega	1980	2322	17.3
Journal of Forest Economics	327	386	18.0	Organizational Dynamics	385	462	20.0
Journal of Health Economics	2082	2442	17.3	Pacific-Basin Finance Journal	931	1087	16.8
Journal of Hospitality, Leisure, Sport & Tourism Education - JoHLSTE	481	551	14.6	Regional Science and Urban Economics	1606	1858	15.7
Journal of Housing Economics	581	682	17.4	Research in Organizational Behavior	399	451	13.0
Journal of Interactive			6.5	Research in Social			14.0

Marketing	1654	1761		Stratification and Mobility	365	416	
Journal of International Economics	2266	2615	15.4	Research Policy	3310	3900	17.8
Journal of International Financial Markets, Institutions & Money	585	690	17.9	Resource and Energy Economics	1117	1298	16.2
Journal of International Management	1654	1245	-24.7	Resources Policy	1413	1642	16.2
Journal of International Money and Finance	1850	2169	17.2	Review of Economic Dynamics	830	973	17.2
Journal of Macroeconomics	541	644	19	Scandinavian Journal of Management	1270	1462	15.1
Journal of Manufacturing Systems	992	1088	9.7	Sport Management Review	446	505	13.2
Journal of Mathematical Economics	2399	2710	13	Technological Forecasting and Social Change	1625	1924	18.4
Journal of Monetary Economics	3093	3519	13.8	Technovation	2594	3015	16.2
Journal of Nutrition Education and Behavior (JNEB)	558	615	10.2	The Leadership Quarterly	871	1004	15.3
Telecommunications Policy	1973	2272	15.2	The North-American Journal of Economics and	743	867	16.7

				Finance			
The Journal of Strategic Information Systems	850	1006	18.4	Tourism Management	2222	2667	20
Utilities Policy	955	1099	15.1	World Development	3740	4275	14.3

Table 4: Journal's subscription prices for the aggregated subject area «Journals within Mathematics and Computer Science»

Journals within Mathematics and Computer Scienc	**Price USA-USD May 19, 2015**	**Price USA-USD October 19, 2016**	**Growth, %**	**Journals within Mathematics and Computer Scienc**	**Price USA-USD May 19, 2015**	**Price USA-USD October 19, 2016**	**Growth, %**
Acta Mathematica Scientia	1110	1284	15.7	Computers & Electrical Engineering	2357	2713	15.1
Ad Hoc Networks	803	955	18.9	Computers & Fluids	4351	5010	15.1
Advances in Applied Mathematics	1236	1097	-11.2	Computers & Graphics	2768	3158	14.1
Advances in Engineering Software	3564	4046	13.5	Computers & Industrial Engineering	4410	5077	15.1
Advances in Mathematics	3977	4037	1.5	Computers & Mathematics with Applications	6442	6345	-1.5
Annals of Pure and Applied Logic	2182	2042	-6.4	Computers & Security	1452	1711	17.8
Annual Reviews in Control	858	953	11.1	Computers & Structures	8925	9684	8.5
Applied and			1.6	Computers and			17.2

Computational Harmonic Analysis	557	566		Electronics in Agriculture	2377	2787	
Applied Mathematical Modelling	2728	3118	14.3	Computers in Biology and Medicine	3263	3740	14.6
Applied Mathematics and Computation	8588	9540	1.1	Computers in Industry	2021	2349	16.2
Applied Mathematics Letters	2790	2832	1.5	Control Engineering Practice	2712	3152	16.2
Applied Numerical Mathematics	3074	3074	0	Cortex	2182	2535	16.2
Applied Soft Computing	887	1058	19.3	Data & Knowledge Engineering	2317	2526	9
Artificial Intelligence	2864	2821	-1.5	Decision Support Systems	1920	2284	19
Artificial Intelligence in Medicine	1334	1329	-0.4	Design Studies	1595	1436	-10
Automatica	4119	4948	20.1	Differential Geometry and its Applications	982	1107	12.7
Bulletin des Sciences Mathématiques	805	817	1.5	Digital Investigation	1082	1269	17.3
Chaos, Solitons & Fractals	4407	4473	1.5	Digital Signal Processing	788	937	18.9
Cognition	2573	3046	18.4	Discrete Applied Mathematics	3811	3969	4.1
Cognitive Systems Research	688	745	8.3	Discrete Mathematics	4004	3944	1.5
Communications			19.7	Discrete			14.6

in Nonlinear Science and Numerical Simulation	1206	1444		Optimization	669	679	
Comptes Rendus Mathematique	1711	1885	10.2	Displays	1237	1418	12.7
Computational Geometry	1174	1192	1.5	Ecological Complexity	730	823	17.3
Computational Statistics & Data Analysis	3233	3281	1.5	Electronic Commerce Research and Applications	757	888	13.5
Computer Aided Geometric Design	1319	1512	14.6	Engineering Analysis with Boundary Elements	3335	3786	59.3
Computer Communications	2880	3331	5.7	Engineering Applications of Artificial Intelligence	2097	2448	14.6
Computer Languages, Systems and Structures	1018	875	-14	European Journal of Combinatorics	1447	1469	16.2
Computer Methods in Applied Mechanics and Engineering	8717	7100	-18.5	European Journal of Operational Research	7988	8653	16,2
Computer Networks	3327	3884	16.7	Expert Systems with Applications	4765	5641	16.2
Computer Speech and Language	730	861	17.9	Expositiones Mathematicae	503	511	9
Computer Standards & Interfaces	1604	1855	15.6	Finite Elements in Analysis and Design	2702	3082	19

Computer Vision and Image Understanding	2123	2478	16.7	Finite Fields and Their Applications	545	567	-10
Computer-Aided Design	2911	3383	16.2	Fuzzy Sets and Systems	5505	5588	12.7
Computerized Medical Imaging and Graphics	2575	2831	9.9	Future Generation Computer Systems	1674	1973	17.3
Games and Economic Behavior	1284	1506	17.3	Journal of Number Theory	1743	1770	18.9
Graphical Models	1027	1183	15.2	Journal of Parallel and Distributed Computing	1660	1929	16.2
Historia Mathematica	460	436	-5.2	Journal of Pragmatics	1711	2025	18,4
Image and Vision Computing	2406	2783	15.7	Journal of Process Control	1993	2326	16.7
Information and Computation	1453	1249	-14	Journal of Pure and Applied Algebra	3042	2847	-6.4
Information and Management	1385	1646	18.8	Journal of Statistical Planning and Inference	4560	4001	-12.3
Information and Software Technology	1720	2018	17.3	Journal of Symbolic Computation	1005	1020	1.5
Information Fusion	806	960	19.1	Journal of Systems and Software	3279	3810	16.2
Information Processing Letters	2489	2526	1.5	Journal of Systems Architecture	2121	2386	12.5
Information Sciences	6614	7686	16.2	Journal of The Franklin Institute	3175	3486	9.8

Indagationes Mathematicae	565	565	0	Journal of the Korean Statistical Society	430	456	6
Integration, the VLSI Journal	1226	1405	14.6	Journal of Visual Communication and Image Representation	1172	1375	17.3
International Journal of Approximate Reasoning	1442	1463	1.5	Journal of Visual Languages and Computing	780	910	16.7
International Journal of Critical Infrastructure Protection	509	600	17,9	Journal of Web Semantics	779	914	17.3
International Journal of Forecasting	996	1059	6.3	Knowledge-Based Systems	1857	2189	17.9
International Journal of Human-Computer Studies	3334	3838	15.1	Linear Algebra and its Applications	5968	6058	1.5
International Journal of Non-Linear Mechanics	2670	2307	-13.6	Mathematical Biosciences	3871	4292	10.9
Journal de Mathématiques Pures et Appliquées	1261	1280	1.5	Mathematical Social Sciences	1783	1976	10.8
Journal of Algebra	5314	5129	-3.5	Mathematics and Computers in Simulation	3310	3310	0
Journal of Applied			1.7	Medical Image Analysis			17.8

Mathematics and Mechanics	5606	5704			1391	1639	
Journal of Approximation Theory	2445	1992	-18.5	Neural Networks	3727	3123	-16.2
Journal of Combinatorial Theory, Series A	1713	1473	-14.0	Neurocomputing	1086	4414	306.4
Journal of Combinatorial Theory, Series B	663	673	1.5	Nonlinear Analysis: Hybrid Systems	1119	1295	15.7
Journal of Complexity	887	989	11.5	Nonlinear Analysis: Real World Applications	1481	1678	13.3
Journal of Computational and Applied Mathematics	6760	7402	9.5	Ocean Modelling	575	1171	103.7
Journal of Computational Science	907	1064	17.3	Operations Research Letters	1159	1353	16.7
Journal of Computer and System Sciences	1585	1609	1.5	Optical Switching and Networking	3540	668	-81.1
Journal of Differential Equations	4732	4661	-1.5	Parallel Computing	2220	2253	1.5
Journal of Econometrics	4415	5001	13.3	Pattern Recognition	4786	5588	16.8
Journal of Economic Dynamics and Control	2682	3103	15.7	Pattern Recognition Letters	3475	4038	16.2
Journal of Functional	3073	3027	-1.5	Performance Evaluation	2581	2595	0.5

Analysis							
Journal of Geometry and Physics	1919	1737	-9.5	Pervasive and Mobile Computing	956	1127	17.9
Journal of Manufacturing Systems	992	1088	9.7	Review of Economic Dynamics	830	973	17.2
Journal of Mathematical Analysis and Applications	9433	10582	12.2	Robotics and Autonomous Systems	2355	2391	1.5
Journal of Mathematical Economics	2399	2710	13	Science of Computer Programming	1556	1580	1.5
Journal of Multivariate Analysis	1937	2018	4.2	Signal Processing	4936	5683	15.1
Journal of Network and Computer Applications	1308	1579	20.7	Signal Processing: Image Communication	1663	1923	15.6
Spatial Statistics	738	866	17.3	Simulation Modelling Practice and Theory	1550	1755	13.2
Speech Communication	2181	2435	11.6	Theoretical Computer Science	5564	5481	-1.5
Statistics & Probability Letters	3075	3203	4.2	Topology and its Applications	3095	3141	1.5
Stochastic Processes and their Applications	1576	1751	11.1	Telematics and Informatics	1657	1899	14.6

Figures 1 and 2 show the points of the field, and linear regression relationship between journal metrics and the subscription price for the first and the second aggregated subject areas of journals (further we'll call it as group 1 and

group 2). In both cases, the best values of the Pearson correlation coefficient were for the dependence between the SJR and the subscription price (Figure 1, 2). Correlation coefficients for all three journal metrics for the second group of journals (Figure 2) were significantly lower than for the first group of journals (Figure 1). Due to the fact, that the sales of Mathematics and Computer Science journals are less commercialized than sales of Economics journals.

The lack of strong correlations between journal metrics and the subscription price on the market of scientific periodicals depends on that that, that this market is not elastic and highly monopolized.

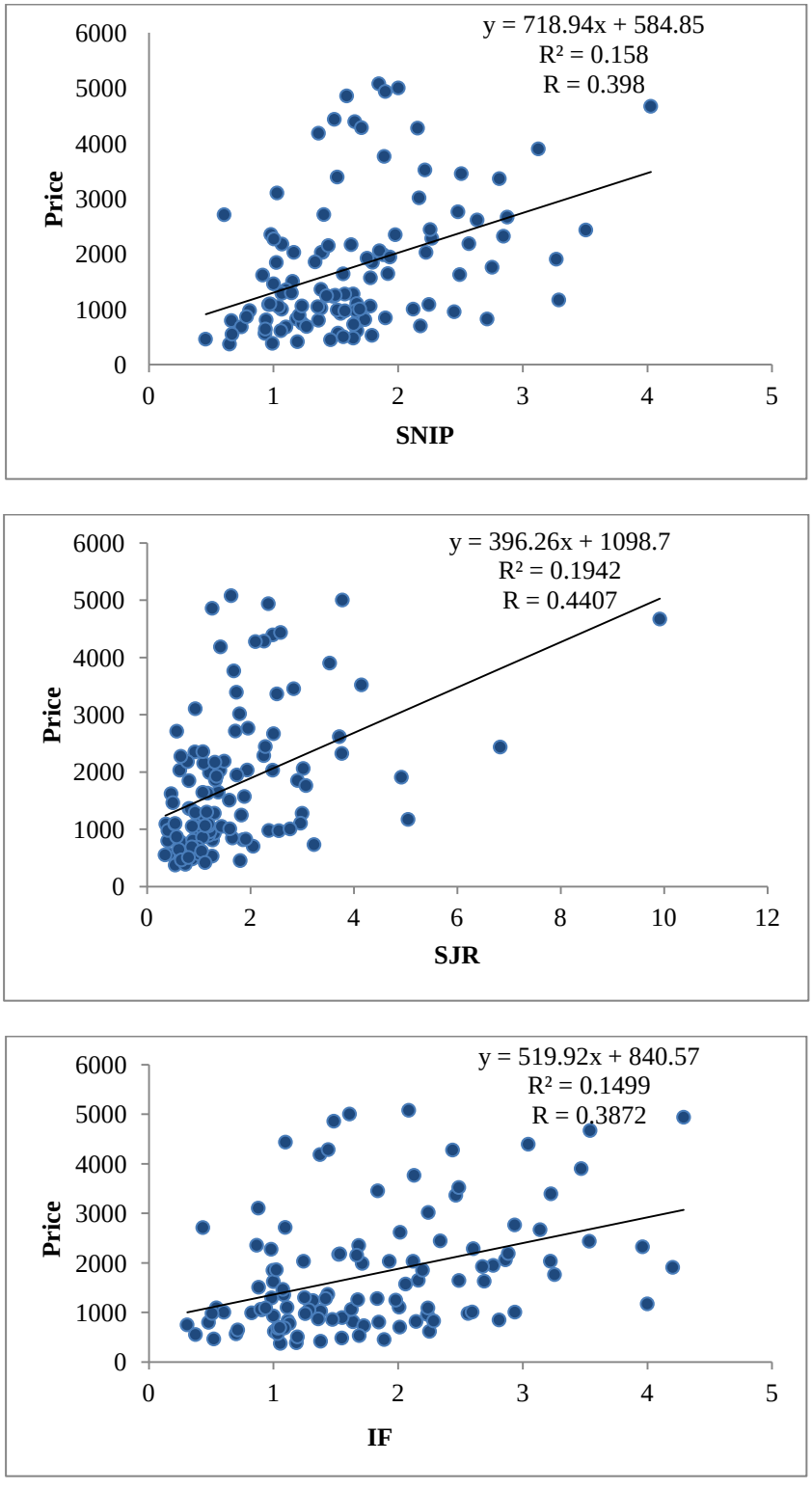
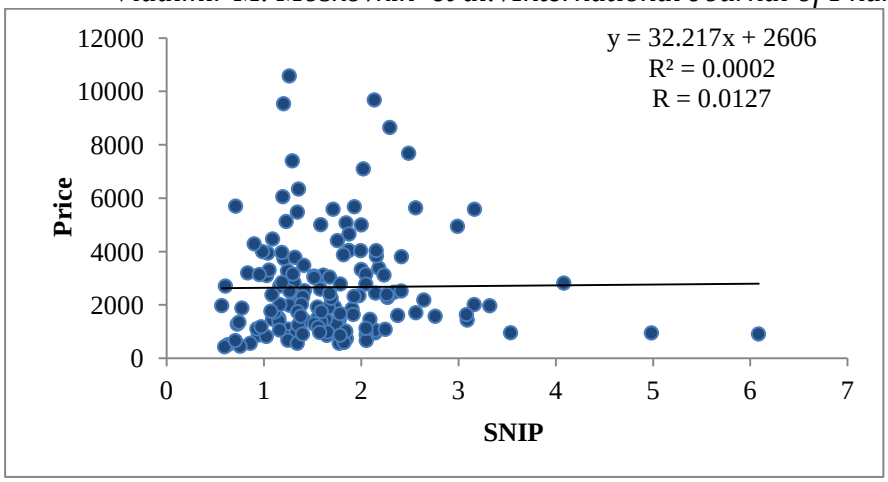
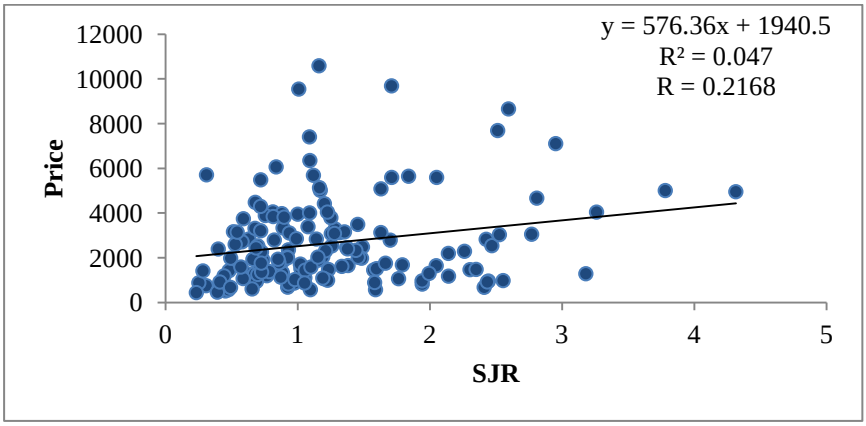


Figure 1. Regression relationships between journal metrics and the subscription price for the first group of journals





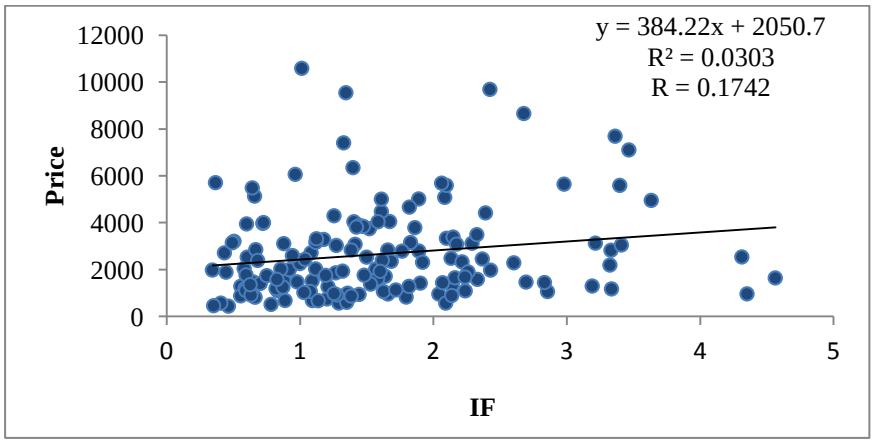


Figure 2. Regression relationships between journal metrics and the subscription price for the second group of journals

Based on the Table 3 and 4, the average subscription prices for both groups of journals were calculated, and based on their values, their growth was calculated.

Table 5: Calculation of average annual growth of the subscription price for both groups of journals.

Journal's Group	Average Price, May 2015	Average Price, October 2016	Growth, %	Annual Growth, %
Journals within Economics, Finance				

Business, Management and Accounting (114)	1534.4	1766.3	15.1	10.9
Journals within Mathematics and Computer Science (150)	2472.8	2660.7	7.6	5.5

Recalculation of this growth on an annual time interval has been done on the basis of interval of 500 days between the data collection of the subscription prices, provided that they will increase evenly, during the research period. For example, for the first group of journals we put: (15.1*360)/500 = 10.9

As we can see, the growth of the subscription prices on more commercialized market of Economics journals is bigger in two times than on less commercialized market of Mathematics and Computer Science journals.

Conclusion.

The correlation analysis between journal metrics values (SNIP, SJR, IF) and their subscription price of the two group of journals (114 Economics Journals and 150 Mathematics and Computer Science Journals), presented on Elsevier web site in October 2016 have given us the following results.

1. For both groups, the best values of Pearson correlation coefficient was observed between SJR and the subscription price.
2. Correlation coefficients for all three journal metrics of the second group of journals were significantly lower that at the first group of journals due to the fact that sales of Mathematics and Computer Science journals are less commercialized comparing with the sales of Economics journals.
3. The lack of strong correlations between journal metrics and subscription price on the market of scientific periodicals is in total due to the fact that this market is not elastic and over monopolized.

Also it was a conclusion that the growth of the subscription price on the more commercialized market of Economics Journals is approximately twice bigger than on the less commercialized market of Mathematics and Computer Science journals.

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