

What is the central matter of Economics? An investigation using JEL code centrality

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Heck and Zaleski (1991)

http://www.aeaweb.org/journal/jel_class_system.html

http://files.eprints.org/122/1/jel_subjects.xml

At level 0: 20 classes. At level 1: 128 classes. At level 2: 757 classes.

<http://repec.org> has 615 archives.

There are 103154 papers for which RePEc has some JEL classification data available.

There are 2522 papers with classes only in level 0, 11950 papers with classes only in level 1, 80921 papers with classes only in level 2.

Papers that have classes of level 0 have on average 1.29 classes. Papers that have classes of level 1 have on average 2.09 classes. Papers that have classes of level 2 have on average 2.68 classes.

There are 267 papers with classes in level 0 and level 1. There are 7359 with papers with classes in level 1 and level 2. There are 86 papers with classes in level 0 and level 2. There are 49 papers with classes in all three levels.

22544 co-occurrences are ignored, 295123 co-occurrences are considered.

At level 0, 2924 can be used for analysis, 154 paper per class. At level 1, 19625 can be used for analysis, 155 paper per class. At level 2, 88415 can be used for analysis, 117 papers per class.

The classes “Y2” and “Y3” are not used in the RePEc data. “A3”, “A39” and “B54” are not used with other categories..

Table 1

extract of the distance matrix at level 0

	A	B	C	D	E	F	G	H	I	J	K	L
R		1.0		1.0		0.3		0.5	5.0	0.8	1.0	
Y	0.4											
Z	12.0		0.9		12.0	1.0	0.6	12.0	1.7	2.0	12.0	12.00

The approach is like Newman (2001). Let there be P classified papers. Let there be a paper p , and let there be $n(p)$ classifications attached to the paper p . Let $\delta(p, c)$ be 1 if paper p belongs to class c and 0 otherwise. Then we define the strength of co-use of classifications c_i and c_j as $s(i, j)$ where

$$s(i, j) = \sum_{p=1}^P \frac{\delta(p, i) \delta(p, j)}{n(p) - 1}$$

We can then define the distance $d(i, j)$ between categories i and j as

$$d(i, j) = \frac{1}{s(i, j)}, \quad \text{if } s(i, j) > 0$$

Suppose we want to go from K to Z. The direct path is 12.0 long. There is an indirect path that is shorter. Go from K to R. The distance is 1.0. Go from R to F. The distance is 0.3. Finally go from F to Z. The distance is 1.0. Thus, the indirect path only has length 2.3.

Dijkstra (1953) algorithm <http://www.sabren.net/code/perl/dijkstra>

A class can be said to be central if it has the shortest average path to all other nodes. If there are C classes, it is convenient to define the centrality of class c , $q(c)$ as

$$q(c) = \frac{C - 1}{\sum_{c=1}^C d_{\min}(i, c)}$$

This measure is larger the more the average distance is smaller, suggesting higher centrality. This concept is known as closeness centrality.

Alternatively, we can consider that the centrality of a class is give by how much it appears on the shortest paths between other classes. Let $p(i, j, k)$ the number of paths between i and j that pass through class k , and $p(i, j)$ the total number of paths between i and j . This gives

$$b(c) = \sum_{i \neq j, j \neq k, k \neq i} \frac{p(i, j, k)}{p(i, j)}$$

If a class c has $b(c) = 0$, it is a marginal class. Otherwise this measure is larger the more the class lies on the path between others. This concept is known as betweenness centrality.

Table 2

Correlation level 0

	size	closeness	betweenness
size		61.43	66.58
closeness	61.43		64.29
betweenness	66.58	64.29	

Table 3

Correlation level 1

	size	closeness	betweenness
size		75.96	79.52
closeness	75.96		51.11
betweenness	79.52	51.11	

Table 4

Correlation level 2

	size	closeness	betweenness
size		65.56	76.43
closeness	65.56		33.86
betweenness	76.43	33.86	

At level 0, 8 classes, i.e. 40.00% of the total analysed, are marginal. At level 1, 57 classes, i.e. 44.88% of the total analysed, are marginal. At level 2, 391 classes, i.e. 51.79% of the total analysed, are marginal.

The full paper is at <http://openlib.org/home/krichel/papers/woodbury.pdf>.

References

- Dijkstra, E., 1953. A note on two problems is connexion with graphs. *Numerische Mathematik*.
- Heck, J.-L., Zaleski, P. A., 1991. Trends in economic-journal literature. *Atlantic Economic Review* xix (4), 27–32.
- Newman, M. E., 2001. Scientific collaboration networks. ii. shortest paths, weighted networks, and centrality. *Physical Review E*.

Table 5

criterium: size, level 0

629	E	Macroeconomics and Monetary Economics
395	G	Financial Economics
387	P	Economic Systems
296	O	Economic Development, Technological Change, and Growth
254	L	Industrial Organization
238	J	Labor and Demographic Economics
220	H	Public Economics
215	A	General Economics and Teaching
177	Q	Agricultural and Natural Resource Economics; Environmental...
163	R	Urban, Rural, and Regional Economics
142	Z	Other Special Topics
120	C	Mathematical and Quantitative Methods
107	K	Law and Economics
91	N	Economic History
70	I	Health, Education, and Welfare
69	D	Microeconomics
68	B	Schools of Economic Thought and Methodology
65	F	International Economics
24	M	Business Administration and Business Economics; Marketing;...
12	Y	Miscellaneous Categories

Table 6

criterium: closeness, level 0

267% [14]	E	Macroeconomics and Monetary Economics
261% [1]	F	International Economics
243% [7]	G	Financial Economics
236% [6]	O	Economic Development, Technological Change, and Growth
235% [8]	P	Economic Systems
228% [4]	Q	Agricultural and Natural Resource Economics; Environmental...
227% [3]	Z	Other Special Topics
226% [2]	C	Mathematical and Quantitative Methods
202% [9]	J	Labor and Demographic Economics
202% [5]	D	Microeconomics
197% [10]	H	Public Economics
184% [15]	L	Industrial Organization
175% [11]	K	Law and Economics
164% [12]	B	Schools of Economic Thought and Methodology
163% [16]	R	Urban, Rural, and Regional Economics
160% [13]	I	Health, Education, and Welfare
145% [17]	N	Economic History
139% [19]	A	General Economics and Teaching
113% [18]	M	Business Administration and Business Economics; Marketing;...
87% [20]	Y	Miscellaneous Categories

Table 7

criterium: betweenness, level 0

34%	[3]	E	Macroeconomics and Monetary Economics
28%	[2]	O	Economic Development, Technological Change, and Growth
26%	[1]	F	International Economics
12%	[14]	P	Economic Systems
12%	[15]	G	Financial Economics
9%	[4]	A	General Economics and Teaching
4%	[17]	L	Industrial Organization
4%	[12]	Q	Agricultural and Natural Resource Economics; Environmental...
2%	[18]	H	Public Economics
2%	[10]	C	Mathematical and Quantitative Methods
1%	[9]	K	Law and Economics
1%	[7]	D	Microeconomics

Table 8

criterion: size, level 1

1019	F1	Trade
973	J1	Demographic Economics
894	D8	Information, Knowledge, and Uncertainty
795	F3	International Finance
764	Z0	General
731	C7	Game Theory and Bargaining Theory
714	E5	Monetary Policy, Central Banking, and the Supply of Money...
704	L1	Market Structure, Firm Strategy, and Market Performance...
701	O1	Economic Development
698	J3	Wages, Compensation, and Labor Costs
669	G1	General Financial Markets
653	H2	Taxation, Subsidies, and Revenue
651	C5	Econometric Modeling
650	C1	Econometric and Statistical Methods: General
631	I2	Education
630	J2	Time Allocation, Work Behavior, and Employment Determination...
626	O3	Technological Change; Research and Development
623	D1	Household Behavior and Family Economics
622	O4	Economic Growth and Aggregate Productivity
599	I1	Health
592	E3	Prices, Business Fluctuations, and Cycles
570	F2	International Factor Movements and International Business...
568	F4	Macroeconomic Aspects of International Trade and Finance...
565	D4	Market Structure and Pricing
537	D7	Analysis of Collective Decision-Making
460	J6	Mobility, Unemployment, and Vacancies
460	C3	Econometric Methods: Multiple; Simultaneous Equation Models;...
456	E2	Consumption, Saving, Production, Employment, and Investment...
447	G3	Corporate Finance and Governance

Table 9

criterion: closeness, level 1

400% [54]	D4	Market Structure and Pricing
400% [70]	D1	Household Behavior and Family Economics
400% [86]	L1	Market Structure, Firm Strategy, and Market Performance...
395% [118]	F1	Trade
391% [63]	F2	International Factor Movements and International Business...
390% [79]	J2	Time Allocation, Work Behavior, and Employment Determination...
390% [78]	O3	Technological Change; Research and Development
389% [76]	O4	Economic Growth and Aggregate Productivity
389% [112]	D8	Information, Knowledge, and Uncertainty
388% [115]	J1	Demographic Economics
387% [29]	D2	Production and Organizations
387% [35]	E2	Consumption, Saving, Production, Employment, and Investment...
386% [92]	J3	Wages, Compensation, and Labor Costs
386% [6]	D3	Distribution
385% [94]	O1	Economic Development
385% [104]	Z0	General
384% [100]	C7	Game Theory and Bargaining Theory
384% [107]	F3	International Finance
384% [69]	F4	Macroeconomic Aspects of International Trade and Finance...
381% [97]	E5	Monetary Policy, Central Banking, and the Supply of Money...
381% [26]	L2	Firm Objectives, Organization, and Behavior
379% [91]	G1	General Financial Markets
377% [81]	E3	Prices, Business Fluctuations, and Cycles
370% [39]	E4	Money and Interest Rates
367% [52]	G3	Corporate Finance and Governance
366% [87]	I1	Health
365% [59]	J6	Mobility, Unemployment, and Vacancies
364% [77]	D7	Analysis of Collective Decision-Making
363% [98]	H2	Taxation, Subsidies, and Revenue

Table 10

criterium: betweenness, level 1

18%	[1]	L1	Market Structure, Firm Strategy, and Market Performance...
16%	[2]	D8	Information, Knowledge, and Uncertainty
13%	[7]	F1	Trade
12%	[3]	D1	Household Behavior and Family Economics
9%	[73]	J1	Demographic Economics
9%	[10]	O1	Economic Development
8%	[15]	E5	Monetary Policy, Central Banking, and the Supply of Money...
8%	[16]	J3	Wages, Compensation, and Labor Costs
8%	[5]	Q2	Renewable Resources and Conservation
8%	[12]	H2	Taxation, Subsidies, and Revenue
8%	[6]	D4	Market Structure and Pricing
7%	[17]	J2	Time Allocation, Work Behavior, and Employment Determination...
7%	[79]	F3	International Finance
7%	[44]	G1	General Financial Markets
7%	[24]	O4	Economic Growth and Aggregate Productivity
7%	[28]	O3	Technological Change; Research and Development
6%	[76]	C7	Game Theory and Bargaining Theory
6%	[4]	B4	Economic Methodology
5%	[11]	E0	General
5%	[9]	L2	Firm Objectives, Organization, and Behavior
4%	[83]	F4	Macroeconomic Aspects of International Trade and Finance...
4%	[98]	E3	Prices, Business Fluctuations, and Cycles
4%	[70]	E2	Consumption, Saving, Production, Employment, and Investment...
3%	[8]	P2	Socialist Systems and Transitional Economies
3%	[62]	E6	Macroeconomic Policy Formation, Macroeconomic Aspects of...
3%	[51]	G2	Financial Institutions and Services
3%	[19]	L5	Regulation and Industrial Policy
3%	[107]	D7	Analysis of Collective Decision-Making
3%	[118]	I2	Education

Table 11

criterium: size, level 2

3065	E52	Monetary Policy (Targets, Instruments, and Effects)
2842	E32	Business Fluctuations; Cycles
2639	J31	Wage Level and Structure; Wage Differentials by Skill,...
2438	G12	Asset Pricing; Trading volume; Bond Interest Rates
2424	D82	Asymmetric and Private Information
2413	C22	Time-Series Models
2228	C72	Noncooperative Games
2137	F31	Foreign Exchange
2094	E31	Price Level; Inflation; Deflation
2091	J24	Human Capital; Skills; Occupational Choice; Labor Productivity...
1898	C32	Time-Series Models
1782	G21	Banks; Other Depository Institutions; Micro Finance Institutions;...
1753	L13	Oligopoly and Other Imperfect Markets
1733	E58	Central Banks and Their Policies
1677	F13	Commercial Policy; Protection; Promotion; Trade Negotiations;...
1619	F41	Open Economy Macroeconomics
1616	E24	Macroeconomics: Employment; Unemployment; Wages; Intergenerational...
1596	F15	Economic Integration
1553	J64	Unemployment: Models, Duration, Incidence, and Job Search...
1532	D72	Economic Models of Political Processes: Rent-Seeking, Elections,...
1509	D81	Criteria for Decision-Making under Risk and Uncertainty...
1466	E62	Fiscal Policy; Public Expenditures, Investment, and Finance;...
1435	C23	Models with Panel Data
1403	C14	Semiparametric and Nonparametric Methods
1392	D83	Search; Learning; Information and Knowledge; Communication;...
1389	O40	General
1378	D31	Personal Income, Wealth, and Their Distributions
1364	D63	Equity, Justice, Inequality, and Other Normative Criteria...
1351	G15	International Financial Markets

Table 12

criterion: closeness, level 2

299%	[754]	E32	Business Fluctuations; Cycles
297%	[755]	E52	Monetary Policy (Targets, Instruments, and Effects)
296%	[617]	E58	Central Banks and Their Policies
296%	[589]	E24	Macroeconomics: Employment; Unemployment; Wages; Intergenerational...
296%	[748]	C22	Time-Series Models
296%	[718]	E31	Price Level; Inflation; Deflation
295%	[476]	E44	Financial Markets and the Macroeconomy
295%	[590]	F41	Open Economy Macroeconomics
294%	[725]	F31	Foreign Exchange
294%	[750]	D82	Asymmetric and Private Information
294%	[672]	C32	Time-Series Models
294%	[753]	J31	Wage Level and Structure; Wage Differentials by Skill,...
294%	[733]	C72	Noncooperative Games
293%	[576]	J64	Unemployment: Models, Duration, Incidence, and Job Search...
293%	[251]	E43	Determination of Interest Rates; Term Structure of Interest...
293%	[751]	G12	Asset Pricing; Trading volume; Bond Interest Rates
292%	[556]	E62	Fiscal Policy; Public Expenditures, Investment, and Finance;...
292%	[723]	J24	Human Capital; Skills; Occupational Choice; Labor Productivity...
292%	[644]	G21	Banks; Other Depository Institutions; Micro Finance Institutions;...
292%	[514]	G15	International Financial Markets
291%	[408]	C12	Hypothesis Testing
291%	[170]	E61	Policy Objectives; Policy Designs and Consistency; Policy...
291%	[475]	G14	Information and Market Efficiency; Event Studies
291%	[402]	F33	International Monetary Arrangements and Institutions
290%	[536]	D83	Search; Learning; Information and Knowledge; Communication;...
290%	[140]	E42	Monetary Systems; Standards; Regimes; Government and the...
290%	[637]	L13	Oligopoly and Other Imperfect Markets
290%	[493]	G11	Portfolio Choice; Investment Decisions
290%	[552]	C23	Models with Panel Data

Table 13

criterium: betweenness, level 2

25%	[1]	E32	Business Fluctuations; Cycles
17%	[2]	D82	Asymmetric and Private Information
17%	[3]	J31	Wage Level and Structure; Wage Differentials by Skill,...
11%	[11]	C72	Noncooperative Games
10%	[6]	L13	Oligopoly and Other Imperfect Markets
10%	[5]	E24	Macroeconomics: Employment; Unemployment; Wages; Intergenerational...
10%	[16]	C22	Time-Series Models
10%	[12]	J24	Human Capital; Skills; Occupational Choice; Labor Productivity...
9%	[4]	H21	Efficiency; Optimal Taxation
9%	[9]	D72	Economic Models of Political Processes: Rent-Seeking, Elections,...
9%	[13]	G21	Banks; Other Depository Institutions; Micro Finance Institutions;...
8%	[8]	O40	General
8%	[14]	F13	Commercial Policy; Protection; Promotion; Trade Negotiations;...
8%	[10]	E62	Fiscal Policy; Public Expenditures, Investment, and Finance;...
7%	[7]	H23	Externalities; Redistributive Effects; Environmental Taxes...
6%	[672]	G12	Asset Pricing; Trading volume; Bond Interest Rates
6%	[17]	D31	Personal Income, Wealth, and Their Distributions
6%	[15]	E44	Financial Markets and the Macroeconomy
5%	[641]	F31	Foreign Exchange
5%	[753]	E52	Monetary Policy (Targets, Instruments, and Effects)
5%	[26]	D63	Equity, Justice, Inequality, and Other Normative Criteria...
5%	[24]	O31	Innovation and Invention: Processes and Incentives
4%	[30]	F23	Multinational Firms; International Business
4%	[513]	F15	Economic Integration
4%	[20]	F12	Models of Trade with Imperfect Competition and Scale Economies...
4%	[639]	F41	Open Economy Macroeconomics
4%	[31]	F33	International Monetary Arrangements and Institutions
4%	[621]	J64	Unemployment: Models, Duration, Incidence, and Job Search...
3%	[634]	D81	Criteria for Decision-Making under Risk and Uncertainty...