M-SCORE: AN INDICATOR *QUANTIFYING INDIVIDUAL'S SCIENTIFIC RESEARCH OUTPUT*

FEI SHU

MCGILL UNIVERSITY

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8
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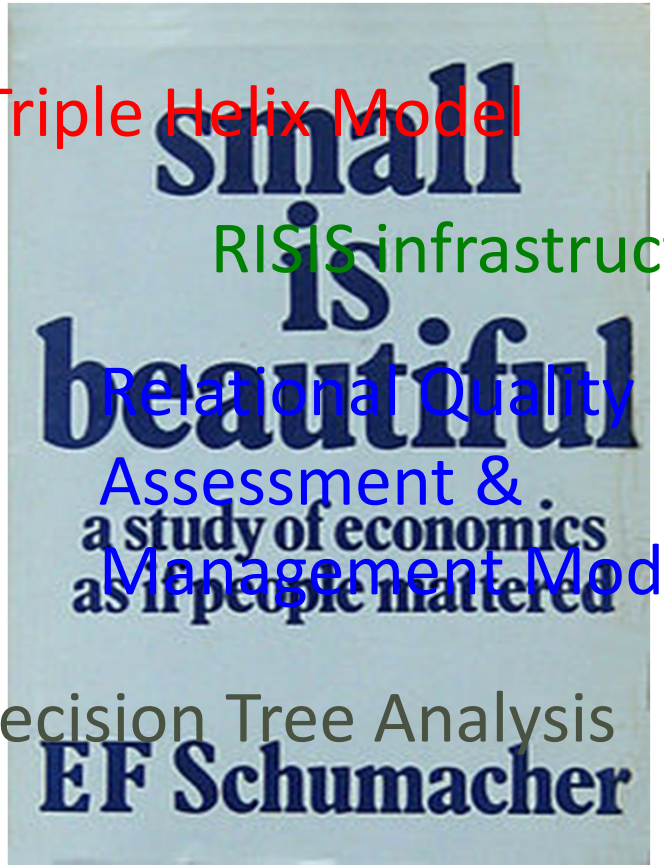
7 8 9 X 9 8 7
9
8
7

WHY



Triple Helix Model

RISIS infrastructure

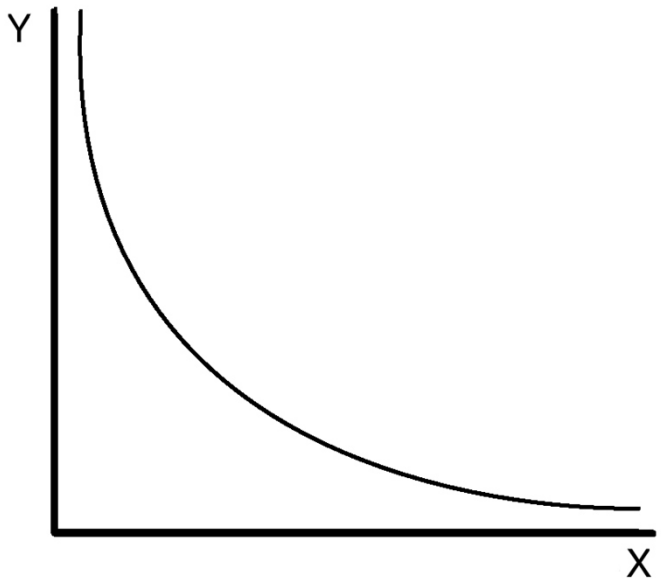
Relational Quality

Assessment &
Management Model

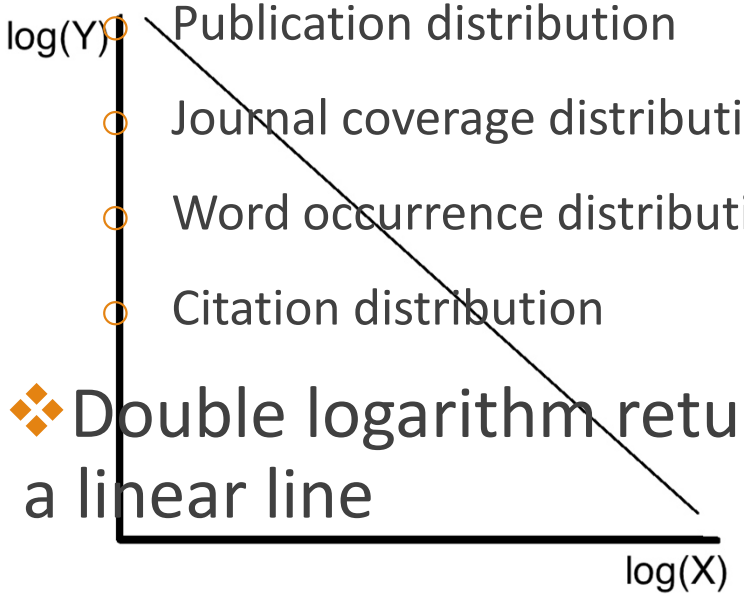
Decision Tree Analysis

- Do policy makers like such complex concepts?
  - Have these complex models or indicators been used?
- Simple indicators is beautiful
  - Impact factor
  - H-index

PARETO DISTRIBUTION



- Bibliometric Distribution
  - Publication distribution
  - Journal coverage distribution
  - Word occurrence distribution
  - Citation distribution
- Double logarithm return a linear line



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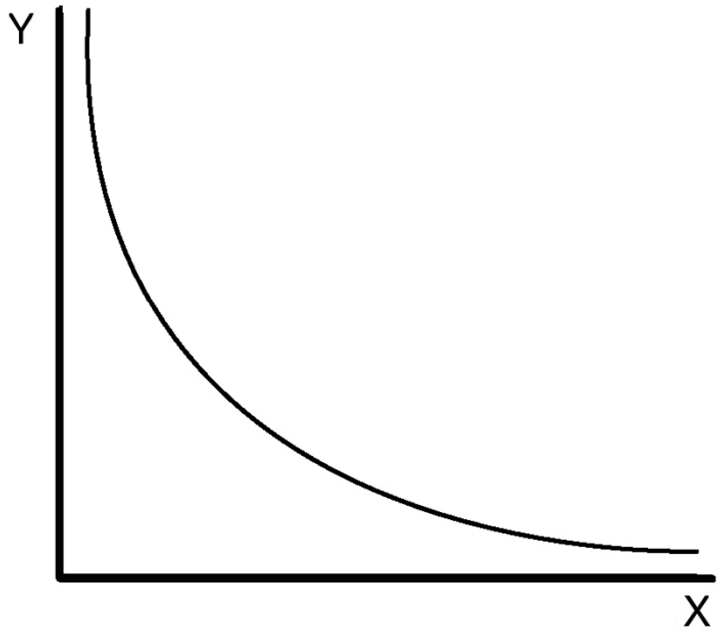
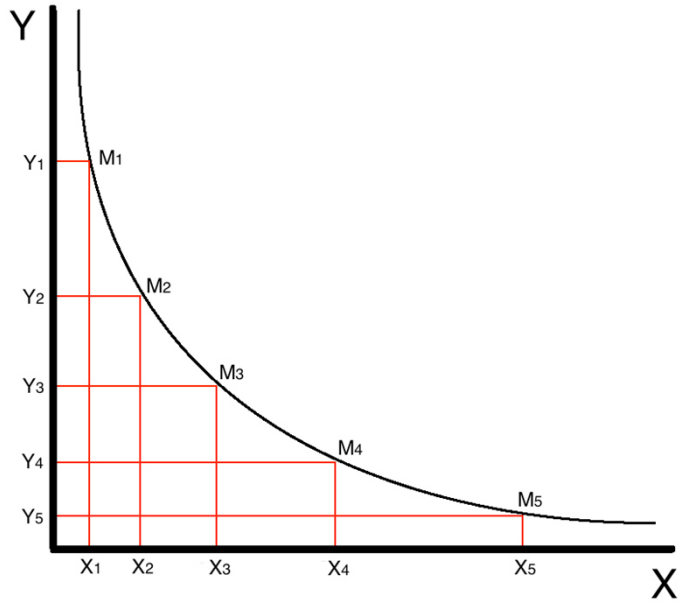


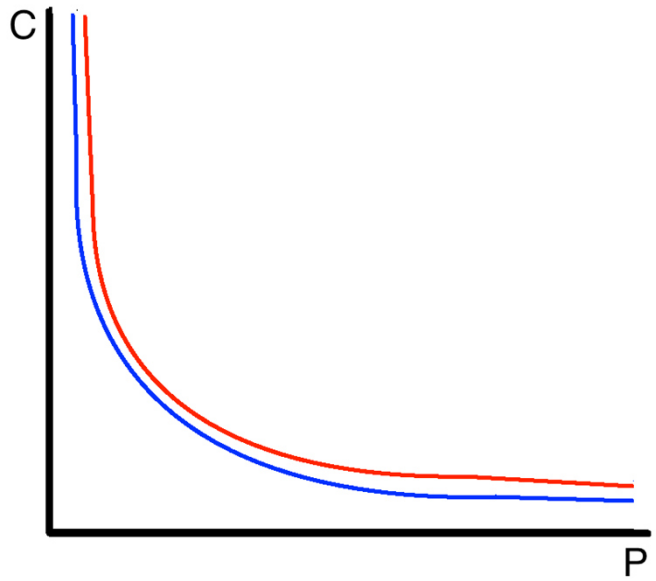
- Log(Y) = a * Log(X) + N
  - A is negative
  - N is a fixed value
- Log(Y) = - Log(X) + N
- Log(Y) + Log(X) = N
- Log(X*Y) = N
- X*Y = N

PARETO DISTRIBUTION



- $X*Y = N$
- $X_1Y_1 = X_2Y_2 = X_3Y_3 = X_4Y_4 = X_5Y_5 = \ldots$
- Citation distribution
  - 1 paper was cited 200 times
  - 10 papers were cited 20 times
  - 20 papers were cited 10 times
  - 200 papers were cited 1 time

CITATION DISTRIBUTION



- X*Y = 200
  - 1 paper was cited 200 times
  - 10 papers were cited 20 times
  - 20 papers were cited 10 times
  - 200 papers were cited 1 time
- X*Y = 100
  - 1 paper was cited 100 times
  - 10 papers were cited 10 times
  - 100 papers were cited 1 time

M-SCORE

- The maximum value of M where M=P*C
- Area CBPO
- Triangle 2C-2P-O
  - Double the area CBPO
  - Reflect the major research impact
  - Exclude the outliers
    - Highly cited papers
    - Lowly cited or uncited papers
  - P and C should be in the range of (0, ½ Pmax) and (0, ½ Cmax)

TEST

Name	Number of Publications	Total Citations Received	h-index
Spink, Amanda	199	6,358	40
Belkin, Nicholas	104	2,921	27
Saracevic, Tefko	78	3,886	23
Cronin, Blaise	168	2,047	23
Marchionini, Gary	122	2,288	23
Bates, Marcia.	45	2,218	19
Borgman, Christine	88	1,923	19
McCain, Katherine	64	1,311	17
White, Howard	32	2,463	16
Fidel, Raya	37	1,064	14

- Top 10 LIS scholars from (Cronin & Meho, 2006)
  - Scopus data
  - Three tie in h-index of 23
  - Two tie in h-index of 19

TEST

Name	Number of Publications	Total Citations Received	h-index	M-score
Spink, Amanda	199	6,358	40	1,682
Belkin, Nicholas	104	2,921	27	1,235
Saracevic, Tefko	78	3,886	23	1,510
Cronin, Blaise	168	2,047	23	672
Marchionini, Gary	122	2,288	23	600
Bates, Marcia.	45	2,218	19	880
Borgman, Christine	88	1,923	19	678
McCain, Katherine	64	1,311	17	330
White, Howard	32	2,463	16	497
Fidel, Raya	37	1,064	14	506

- Differentiate research impact
- Favours scholars with a large set of frequently cited papers
  - McCain: 10 papers were cited at least 33 times
  - Fidel: 11 papers were cited at least 46 times

CONCLUSION

- M-score is Based on the property of the pareto distribution
  - Could be used to measure the individual's
- Fix the inconsistency of h-index addressed by Waltman, L., & van Eck, N. J. (2012)
- Need to be tested more
- Time value could be added
- Could be normalized