Centrality Measures on Networks : A Study of Citation Centrality and Academic Salaries

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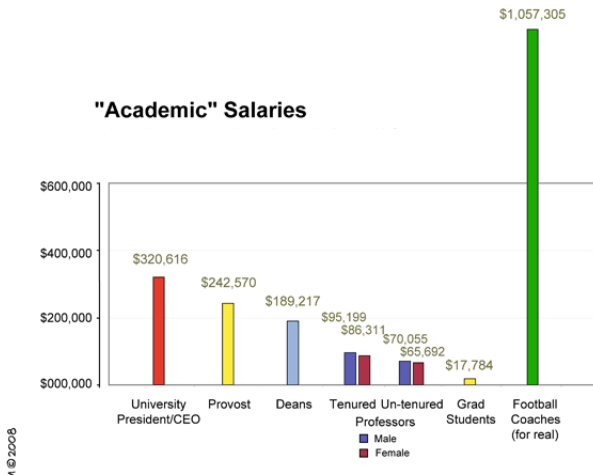April 12, 2012

Outline

Idea

Figure: courtesy of PHD Comics

- How does salary of a professor correlate with research value?
- Is this value gameable?

Previous work

- Academic salaries have been correlated with faculty research productivity, including citation count

- No work which correlate academic salaries with other measure of centrality

- Gamability aspect has not been studied before

Bernard Grofman, Determinants of Political Science Faculty Salaries at the University of California. Political Science, 2009, 719-727.
Luis R. Gomez-Mejia and David B. Balkin. Determinants of Faculty Pay: An Agency Theory Perspective. Academy of Management Journal, 1992, Vol. 35, No. 5, 921-955.

Data

- ► Citation Data
  - Crawl arXiv.org
    - Focus on Theoretical Physics
    - High Energy Physics, Condensed Matter, Statistical Physics. . .
- ► Salary Data
  - Public schools
  - Crawl available data online

Centrality Measures

- ▶ Which centrality measure makes sense?
- - Degree Centrality - Citation Count
- - Page Rank
- - Closeness
- - Betweenness
- - h-index, g-index
- - . . .

Mapping Citation centrality to Research Value

- Self-citations versus citation by other authors
- Journal publications vs. Conference publications
- Value of the Journal or Conference : e.g: Science versus others
- No. of authors in the paper, first author or last etc.

Variables for Regression

- Rank based on citation
- Years since Ph.D.
- Area of research
- Rank of the University
- University location - cost of living
- . . .

Part 1: Regression Analysis

- Gather preliminary data (high energy physicists from California public universities) and perform simple linear regression [2 wks]
- Define other regression variables and acquire such data [1 wk]
- Perform regression with different centrality definitions [2 wk]

Part 2 : Interpretations

- Formulate a better centrality measure.
- Study gameability of such centrality.
- Compare with h-index, g-index.
- If time permits, see if we can predict the future!

Progress so far . . .

- Obtained data sets needed to run a simple linear regression.
- Normalized names from arXiv high energy papers, and matched with names from salary data.
- Inserted citation graph data into Mathematica. Calculating centralities.

Questions

Thank You :-)