Networks, Knowledge Differentiation and the Publication of Clinical Trials for Depression[*†]

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Abstract

In this paper, we argue that the structure of an inter-organizational network of clinical trials affects rates of knowledge production. Moreover, the position of individual organizations in the network largely maps onto different incentives for knowledge generation between pharmaceutical companies and research institutions. Using a co-sponsorship network of clinical trials for depression, we identify a core-periphery structure; calculate the sponsors' coreness and betweenness centrality; and evaluate their effect on publication rates in medical journals. The source of our data is Clinicaltrials.gov, which is a web-based registry of publicly and privately supported clinical studies in the United States. The trials include testing of new drugs, new behavioral therapies, and extending applications of current drugs and therapies. We identified 1534 trials that address mood and affective disorders related to depression that started between January 2000 and December 2011. Our network of clinical trials defines sponsors as nodes and the trials as links. Therefore, there is a link between two firms, universities, hospitals, or national institutes of health if they sponsor a particular clinical trial. Our dependent variable is the "trial's number of publications." Our explanatory variables are "lead sponsor coreness", measured by estimating a vector of Euclidean distances to the core C, such that CC' is highly correlated to the original data matrix; and "lead sponsor betweenness centrality," measured as the sum of all money flows passing from one node to another through it. We control for trial's number of patients, phase of development, number of countries and for trials funded in isolation. The social network analysis reveals the core comprises the National Institute of Mental Health, Bristol-Myers Squibb and the University of Pittsburgh, which indicates there is a intense funds flow among these three organizations. Using negative binomial regressions, we analyze separately and compare the whole sample with three subsamples of funding sources: industry, academic institutions (universities and hospitals), and National Institutes of Health. Studying the network as a whole, the negative binomial regression

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analysis indicates network position does not affect publication rates. Nonetheless, dividing the sample into funding subsamples, our results indicate that among trials funded by industry, trials whose lead sponsors are in the periphery have higher publication rates; among trials funded by academic institutions, trials whose lead sponsors are closer to the core have higher publication rates. However, among trials funded by industry, higher betweenness centrality relates to higher publication rates; whereas betweenness has no significant effect for trials funded by academic institutions. We conclude pharmaceutical firms need to be in the periphery of the sponsorship network, and/or being brokers in the funding flows to obtain relevant clinical results worth of publication, while highlight the dependence of academic institutions from the core.