Power Law Curves Institutional Logic and Firm Production Networks

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It has been demonstrated that power laws describe various phenomena in organization and management studies (Alfarano & Lux, 2007; Andriani & McKelvey, 2009; Axtell, 2001; Gala et al., 2024; O'boyle Jr. & Aguinis, 2012).

An organization is embedded in various institutional logics, and prevailing institutional logic guides its decision-making (Thornton & Ocasio, 2008). A 'capital markets' oriented firm is likely to synthesize a production network that maximizes profits for the firm. Such firms will open offices or branches in locations that have high-profit potential. However, an organization guided by the logic of 'inclusivity and equity' will likely open offices or branches to cater to specific non-economic goal(s). Private organizations fit the former, and government organizations fit the latter.

The economy is viewed as a production network wherein the network structure is linked to macroeconomic outcomes (Carvalho, 2014). Extant literature has shown that network structure tends to influence the propagation of shocks in the network (Acemoglu et al., 2012; Gabaix, 2016). Having argued that institutional logic is a key determinant of organizational decision-making, we pose the research question: What is the impact of institutional logic on the structure of production networks created by an organization? We position institutional logic as one factor that links the micro-level actions of nodes in a network and its overall structure.
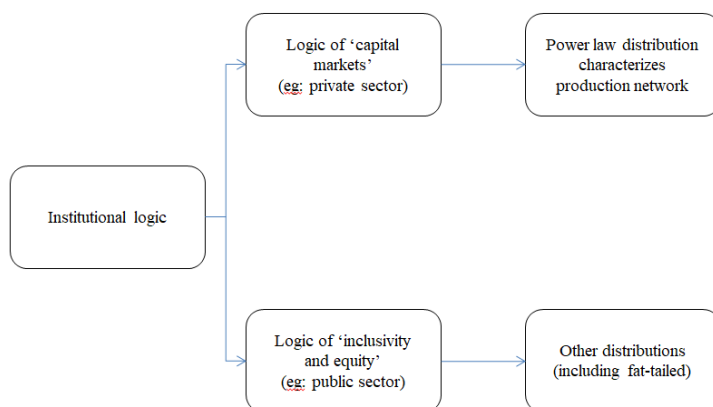
Figure 1: Conceptual model linking institutional logic with the structure of the production network

We theorize that organizations following differing institutional logics will selectively follow the preferential attachment (Barabási & Albert, 1999) when opening nodes in their production network. According to the model, when new agents arrive in a system, they are attracted to larger nodes, which become even larger. The preferential attachment model generates a power law curve. We predict that private organizations will generate a production network that fits a power law curve, and this will not occur in the case of public organizations. We use the Kolmogorov-Smirnov test (Clauset et al., 2009) to fit power-law curves.

Results

We tested the hypothesis on the following datasets across districts of India: (i) branches of private, public, and regional rural banks; (ii) medical doctors (private and Government doctors) in the state of Karnataka; (iii) post-offices; and (iv) Government Health Centres. Power law curves were found in the case of private banks and private medical doctors, supporting our hypothesis. Power law curves did not fit any of the Government-linked networks, but a log-normal curve was found to fit. This is attributed to the Government's use of population thresholds for allotting bank branches, post offices, or health centers, and the population is distributed across cities following fat-tailed distributions.

Implications

Our model describes the spatial distribution of production nodes within a sector. We show that prevailing institutional logic is an antecedent to the spatial distribution of production nodes in a sector.

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