

A Model of the Link Economy

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The "link economy" is commonly used to describe activity on the World Wide Web (WWW) and refers to the value of linking to (and being linked to by) other websites. The distribution of links on the WWW clearly has real economic effects; commercial sites with higher indegrees will be more visible on the Web, and thus visited more frequently, because they will be ranked more highly by Google, for example. However, there has been a surprising lack of economic analysis of linking activity on the Web, with the majority of quantitative analysis using approaches from applied physics. Applied physics has provided the influential characterisation of the WWW as being scale-free, with a small number of sites receiving the lion's share of links. This has been explained using the concept of "preferential attachment" whereby new sites joining the network prefer to link to sites that already have high indegree, thus leading to the "rich get richer" phenomenon. However, for researchers from the social and economic sciences, the preferential attachment argument lacks a strong behavioural foundation and ignores the influence of human activity, for example business practice or politics, on the distribution of links. In this paper, a model of linking behaviour of webbloggers or "bloggers" (writers of personalised, chronologically updated websites) is presented. Bloggers unilaterally form links to other bloggers, incurring a benefit (the expected value of a reciprocal link) and a cost, both of which are dependent on blogger characteristics (ie. a liberal-to-conservative link has a different cost-benefit structure than liberal-to-liberal link). The model is partly parameterised by applying the p^* estimation approach (derived from Markov random graphs) to data on North American "A-list" political bloggers. Agent-based simulation is used to identify the emergent properties of the model which are compared with stylised empirical facts of the political blogosphere.