When Five is a Crowd in the Market Share Attraction Model
The Dynamic Stability of Competition

by Paul Farris, Phillip E. Pfeifer, David Reibstein, and Erjen van Nierop

In this paper we use a very simple model of competition to show how and why five or more competitors vying for profits in an early-stage market might create turbulence in marketing spending. If the turbulence leads to a shakeout (exit of competitors), the same decision rules that caused the turbulence with five or more competitors can then lead the remaining four or fewer competitors to an equilibrium. We believe this is consistent with the notion that non-equilibrium behavior may be part of an evolutionary economy; a market with convergent properties might emerge from one that does not have those properties. We use a model in which buyer reactions follow the market share attraction model (MSA), and sellers may be viewed as following either of two assumptions to optimize their own profits. The first is that sellers use sophisticated technique to measure current customer responses to a range of marketing budgets and choose the current profit-maximizing budget for the next period. A second, completely equivalent, logic is the traditional Cournot assumption: the firm adjusts its spending under an assumption that competitors will not change last-period budgets.

Application of either logic will lead to dynamic instability only when the number of competitors exceeds a threshold level of four. This study provides an analytical explanation for the emergence of this instability and demonstrates the relationship between this system of competing firms and the standard logistic map. We also analyze market conditions that might affect the existence or level of the convergence properties. These include partial adjustment to optimal spending, exogenous growth (independent of marketing spending), and endogenous growth, non-linear marketing attractiveness to spending relationships, carryover effects, and differences in seller marketing efficiencies.

Keywords
Market share attraction model, marketing spending, Nash equilibrium, industry shakeouts, logistic map

Not only in (biological) research, but also in the everyday world of politics and economics, we would all be better off if more people realized that simple nonlinear systems do not necessarily possess simple dynamical properties.

May (1986)